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FOOD INDUSTRIES

MAR 5 1942

● FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

CONVERT OR CLOSE UP! ..WPB DEMANDS OF ALL INDUSTRY

(*SEE PAGE 31*)

MARCH 1942

Food Plants Prepare for Raids

U.S. Army Needs 13 New Foods

The Labor Shortage

How To Keep Trucks Rolling

Bottom Vents Best In Vertical Retorts

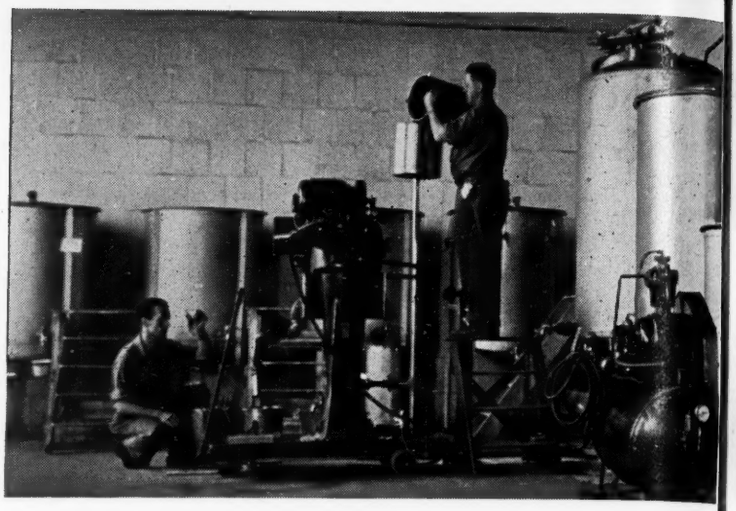
Sweetener Shortage

Preserving Flavor In Drying Milk

A McGRAW-HILL PUBLICATION

BACKGROUND VALUES . . . a PART of the product, APART from the price

WHETHER you're buying a suit of clothes, a radio or food flavors and essential oils, you want to buy where you'll get the *best* values for your money. But best value cannot be measured by any single advantage . . . by *this* concern's attractive price, or *that* concern's quality, or *another's* faultless service. Rather it derives from *balanced* advantages. In the case of flavors and essential oils, it derives from the supplier's rigid conception of purity, uniformity, high quality and fair price; from his facilities for helpful service and patient research; from economies and preferred selection accorded the large scale purchaser of raw materials; from meticulous packaging under ideal conditions of temperature and sanitation; from prompt dispatch of orders and from the countless other minor considerations which, added all together, make for better finished products and for happier relations between discriminating buyer and a reputable source of supply. It is on the basis of these balanced advantages that we believe FRITZSCHE products will prove to be your best values in food flavors, seasoning compounds and essential oils.



Photos, top: Careful centrifuging is but one of the steps taken to insure clarity and cleanliness of product. Center: The practical application of our flavoring and seasoning oils to any given problem is first tested in our model experimental kitchen. Bottom: With us, meticulous packaging is a fetish. Easy pouring, light-proof bottles, clearly labeled and sealed with tapered, easy-to-remove, first quality corks, are topped with tamper-proof metal caps . . . an exclusive feature of Fritzsche Brothers' packaging.

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CONVERT

OR CLOSE UP!

. . . WPB DEMANDS

OF ALL INDUSTRY

The War Production Board has taken off its gloves. It is getting tough. There is no other sound course. This country must go all out on war production. The "too little and too late" performance has already cost the Allies too many battles. The order of the day for food processors and other manufacturers is "convert to war production or close up."

This policy is going to affect a lot of food companies. It may put many out of business unless they swing to production of war, Lease-Lend or necessary civilian commodities.

The full impact of what lies ahead is interpreted on page 31. And concrete suggestions are made as to what food processors can and should do.

FOOD INDUSTRIES

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This Issue

It May Happen Here

Every prognosticator who has attempted to predict the course of events in this war has been wrong more often than not. So no one can say with certainty whether food plants will be bombed. But investigation by FOOD INDUSTRIES reveals that some of the leading food factories on the West Coast are preparing for the worst. The precautions they are taking are told on page 35 by Thomas Robert Edwards, Jr. Many practical devices and technics are described.

Army Challenges You

Food manufacturers and their associations have done much to develop special rations needed by the armed forces. For which the Army is duly grateful. But additional new items are wanted, and the Quartermaster Corps has tossed at the industry a friendly challenge to develop them. Major Jesse H. White named 13 new products that would help the Army, in his talk before the meat section of the National Canners Association convention. And these items are listed in an article on page 38.

Shall We Draft Women?

Labor shortages, far more serious than most food processors realize, face the food industries. Need for men in the armed forces and to man the munitions industries will more than absorb any men released from shrinking civilian supply industries or from the ranks of the unemployed. By summer there will be no reserve of unemployed. Already some canning communities are holding meetings to consider the possibility of drafting women as cannery workers.

What are the figures behind this coming emergency and what can the food industries do about it? See page 60 for a brief summary of the situation.

Sugar, Ships and Shortages

Armies in the field—British, Russian, Chinese, Dutch and American—must be supplied. Allied nations unable to obtain their full quotas of food because of the war must be fed. And sugar from the Philippines no longer is imported because of the Japs. There, in a nutshell, are the immediate causes of sugar shortage and sugar rationing in the United States.

But behind these immediate causes lies a statistical picture of world sugar production and consumption. This picture is sugar coated for FOOD INDUSTRIES' readers on page 54 by R. S. and G. W. McBride, consulting chemical engineers of Washington, D. C.

Coming

How Shall We Package?

Restrictions on cans, paper, cellophane, foil and a score of other materials make one big headache for the food manufacturer. But many things can be done and are being done to alleviate this situation. To learn about the methods and materials that will help to overcome packaging troubles, two steps should be taken:

First, read FOOD INDUSTRIES for April. In its pages will be found a summary of the steps being taken by packaging material manufacturers, packaging machinery manufacturers, food packers and the government.

Second, go to the Packaging Conference and Exposition to be held at the Hotel Astor in New York, April 14–17.

Near 'Ems Don't Count

The literature of technology is more often than not a chronicle of triumphs. But in the working laboratory such is not the case. Many a bright idea lies down and dies between the test tube and the far end of the production line. You don't need to be told that. But perhaps you will enjoy a little company in your misery. You will get it, and more, from a future article describing several ideas that almost made the grade, by W. R. Van Meter, food technologist of Kingston, Pa.

Acid Does the Trick

In October, 1940, FOOD INDUSTRIES published an article by M. E. Parker of Beatrice Creamery Co., showing how the sanitary condition of washed milk cans was improved by the use of an acid rinse after the customary washing with an alkaline detergent solution.

Since that time, Dr. F. M. Scales, director of the research laboratory of Sheffield Farms Co., has developed a can washing method, using an acid detergent in place of an alkaline one, which is giving highly satisfactory results. Dr. Scales will outline the results of his work in FOOD INDUSTRIES for April.

Right Way To Do It

Processing of candied fruit and peel has become one of the major fruit byproducts industries of the United States. And in making these products technologists have discovered that sucrose used alone results in a hard product and that better results are obtained with a blend of sucrose and an enzyme converted corn sirup. What blend to use and how to make glacé fruits will be told in an article by Donald K. Tressler, well-known food technologist.

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FOOD INDUSTRIES
FOR THOSE WHO CONTROL QUALITY
THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor MARCH, 1942

Plant Conversion— The Order of the Day

BETTER get this idea straight, and right now! The United Nations are losing too many battles because of lack of adequate supplies of weapons. Therefore this country must go all out on war production. The policy of the War Production Board is now stated in four words:

Convert or Close Up!

This conversion means to convert every production facility of the United States to war purposes beyond those which provide for the essential and indispensable human needs. Foods for the armed forces, for Lease-Lend and our civil population are, of course, largely essential. But this conversion policy extends to every factory and shop in the country, including the factories which process foods for human consumption.

What has happened to British industry after Dunkerque supplies the pattern to be followed here. The U. S. economy is to become "lean but sound." Some—the majority—of food companies will continue as before, but some must convert or face extinction. In the latter are those making luxury items and some foods that unnecessarily use sugar, tin and scarce materials.

You may well ask: "By what authority do you say this?" I have heard it from the lips of Donald M. Nelson, Philip Reed, James Knowlson and other top men in the War Production Board. For a full day these men dropped all other activities to confer with a large group of editors of business publications, like FOOD INDUSTRIES, in order to tell us in unmistakable terms what is ahead. It is now our job to tell the industry and interpret the WPB policy to the readers of our publications. And here is how it looks:

Your food business, as well as our own business which is that of publishing magazines, must be devoted to war work or to supplying indispensable human needs. The alternative is closing up. This policy applies to all industry, including the food processing industry. The industry (including food processing) which is manufacturing non-essential things and services must either convert to war work or it cannot get supplies, repairs or equipment. The War Production Board does not intend to shut anyone down—yet, although that may come later just as it has come in Britain.

What Donald Nelson told us on Friday, February 13, applies in particular to metal working, textile and rubber manufacturing industries. But to a lesser extent it applies to the food processing industries. Said he:

"We have wasted many 'golden' months in which we could have gotten fully ready—the months in which we could have expanded our steel industry, our chemical industry, our copper industry, and all the others, so that we would have plenty of everything with which to fight.

"But we still have ten 'silver' months—the months that remain in 1942—and in them we can still do things that we never thought possible."

By implication, the months that follow the "silver" months may be "leaden" months if we don't get going. Unless we perform miracles of industrial production in 1942, it should be obvious to any thinking, informed person that we shall taste more of the sorrow and bitterness and defeats that we have suffered up to now. From Dunkerque to Singapore and the Philippines the story has been "too little and too late."

Urgently needed are weapons of all sorts, military supplies of all sorts, and every essential food—all in vast quantities. Russia, Britain, China and our own forces must get food, planes, tanks, guns and ammunition. Ships are needed in ever increasing numbers. In the ten remaining "silver" months of 1942 this nation must produce as we have never produced before.

One Ally has asked for thousands of tons of dried meat (pemmican) and many million pairs of shoes in addition to enormous quantities of munitions. The recent tin-conservation order, the rationing of sugar and rubber, on

top of the needs for munitions, place the problem squarely before all industry, including the food processing industry.

You don't like it? Well, put yourself in the place of one of General MacArthur's soldiers in the Philippines, with no hope of reinforcements, nothing to look forward to but death or surrender.

What You Can Do About It

First of all, stop fretting about whether small business will survive this ordeal. And stop stewing about what your business is going to do after the war is over. If we lose this war, you probably won't have a business. If we lose the war we will be lucky to escape with our lives. The job ahead is to help win the war; or, if we can't figure a way to help, then the least we can do is avoid using up scarce materials.

What is an essential food industry? What sort of a food is indispensable to human needs? Nobody has yet defined that one. Yet if you have any doubt about the place of your products in the indispensable list, then you should be doing some heavy thinking. If I were again managing a food plant I would be asking myself: Is my line something that is normally served on the average American dinner table? If not, I'd be worried and start to think about conversion to some food that would be needed by the Army, Navy or Lease-Lend. If not these, then to something that would be considered to be a food needed by average low-income families. I would pass by all ideas that would require imported food ingredients like coconut, spices or chocolate for the reason that shipping is so scarce and irregular.

Next, I would confer with all the firms that have sold me equipment and supplies to see if they had any suggestions. If my business were a small one I'd call together other nearby small concerns (not all in my line) who were facing similar problems and see what we could do if we were to pool our equipment and facilities.

I would stay in the food business if I could but, if not, I would explore the possibility of getting into some other war work. To do this I would get a copy of the directory of field offices of the Division of Contract Distribution by

The Talk of the Industry

● AFTER many years of effort to avoid splitting peas in canning operations, this department has been a bit disturbed by an inquiry for a machine

which will split them. Frankly, splitting peas is not in our repertory.

● BUSINESS MEN are facing conditions, many for the first time in their lives, where dollars cannot buy goods, regardless of price. If anyone in the food line has been surprised by the turn of events it has not been because he has been deprived of information. FOOD INDUSTRIES has been reminding its readers of what to expect for the past two years. Few would believe it, mainly because they did not want to believe it. One company, however, was sufficiently interested to follow up with personal calls, acted in time, and avoided a certain loss of $110,000, which ought to pay a modest profit on our $3 subscription price.

● TO READ the future correctly is not particularly difficult. Nothing comes about unexpectedly—not even a Pearl Harbor—for the danger signs always show themselves a long time before an event. The difficult part is to have a genuine desire to know what is coming and do a little really hard thinking. To most of us that is, indeed, difficult. And we are too often fact-blind.

Back in 1929, on Memorial Day, this department was offered three new houses costing more than $20,000 for $1 plus assumption of the first and second mortgages. Here was a highly significant fact, indicating scarcity of second-mortgage money, exactly five months before the big crash. Correctly interpreted and coupled with other obvious danger signals, it permitted a degree of peace of mind instead of acute anguish during the next eight years.

FOOD INDUSTRIES cannot tell you how to get rich quick, nor can we avert world shaking events like the present war, but we can remove the element of surprise if you are really interested.

● PACKERS OF COFFEE in vacuum packages are facing much unhappiness in the restrictions imposed on the use of tinplate. Chase & Sanborn coffee, in particular, has had it tough, for only about two months before Pearl Harbor this brand was changed over to vacuum tin cans, and now must be changed to some other package. Moreover, the rubber-tire situation precludes the prolonged use of Standard Brands' speedy motor trucks for coffee distribution. Nevertheless, Chase & Sanborn has an easier task than Maxwell House and many others who have built up a big acceptance of their coffees in vacuum tins.

● DURING the odd moments when one can squint at shop windows, the allure of a feminine garment, euphemistically known hereabouts as a "blackout gown," may register on masculine consciousness. This, be it noted, is matched in the food specialty shops, that cater to the carriage trade, by blackout foods—"blackout cocoa" for example. Though, for most of us, a blackout with a blackout

gown—inhabited, of course— is an experience yet to be tested, one wonders how one would have time for the cocoa?

● A SWISS food technologist attended the frozen food convention in Chicago in January seeking equipment

writing to the War Production Board in Washington. Then I would go to several of the nearest field offices to get their help on possible subcontracts. Then I would really go to work to find something I could make in my place of business with what equipment is already there or with equipment that I might be able to buy with the priorities that would go with A-1 ratings. I would realize that on my own knowledge and skills and initiative would depend what I could do. If I didn't know how, I would learn how to produce something that is really needed to win the war.

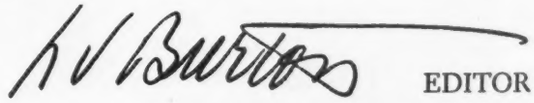
Maybe the plant could be converted into a small chemical plant to make something like what a Southern concern is now producing—a material that makes shoes proof against poisonous gas by a War Department formula. Perhaps I could make some mechanical part in my repair shop. An ice cream cone plant of which I was once in charge had a lathe, a shaper, a drill press, a power saw, two grinders and a forge. With that set-up one could make something that is needed for war. Perhaps we could do the roughing cuts and send the semifinished parts to the prime contractor or subcontractor for finishing.

Or if I owned a fleet of trucks that would have little to do because of sugar rationing, I'd do some hauling, or maybe start a salvage business on scrap metal, cloth, paper, glass, grease or bones.

The point to remember is that the U. S. Government is ready to buy quantities of thousands of items enormously greater than industry is now producing. Most contractors are ready to subcontract with anyone who demonstrates he can help. But the government cannot hunt for you and find out what you can do.

It's entirely up to you to take the initiative, whatever your business—foods or otherwise. Nobody will do it for you. You must discover what you can do, learn how to do it, and then get going. We are losing battles. We may lose the war.

Go to it!



EDITOR

for quick freezing fruits and vegetables. Said he:

"You do not realize how fortunate you are in the United States, for after Pearl Harbor we were forced to seek other means of preserving our perishables than by canning. Why? You have a one-year supply of tin for your canning industry; we have almost none. You can prepare a changeover with a certain amount of deliberation. We, on the other hand, must begin almost instantly."

Away With Piddling Methods!

Nearly every branch of the food industry faces important problems of redesign and reconstruction of packages as a result of the war. But, judged by some of the piddling methods that have been utilized, many concerns have not yet grasped the fact that the United States is at war.

The same shortsighted provincial view which has held that "it can't happen here" seems to persist today, despite sinkings of ships, almost complete conquest of the Philippines and many other setbacks to our own armed forces, to say nothing of the loss of Malaya and other important sources of packaging materials.

Management that is so uninformed that it does not know where raw materials come from, and does not evaluate world conditions correctly, cannot be expected to have plans for sound retreat to safer positions on the packaging front.

Some concerns are now engaged in a series of planless rear-guard actions, such as dropping a single color in the belief that this act will meet the needs of the times, or deciding to change to a different container without adequate study of its availability, with the implied necessity of going into another change before long.

Every change costs money, sometimes large sums. If a change must be made, one should go all the way. To progress to the ultimate by a series of costly changes—by fits and starts—is the way to lose a lot of money, and precious time.

Packaging must be simplified and yet be made adequate for the protective job. The only sound way is to go all the way to a wartime package at the first effort. Don't worry that peace will return and catch you

Hors d'Oeuvres

• *A book of Southern recipes written by the Duchess of Windsor and containing a foreword by Eleanor Roosevelt has just come off the presses. Sort of a "my day in the kitchen with Wally."*

• One million retail outlets, it is estimated, handle carbonated beverages. So don't get discouraged if the first ten places you try are out of your favorite refresher.

• *Dairy farmers are joining the mine workers' union. Which means that milk plant operators will get the coaled shoulder in future price negotiations.*

• "Taystee" bread salesmen are carrying defense stamps on their routes, and many housewives are taking their change in the stamps. If they would sell the stamps and give the bread as change they might be allowed tires for their trucks.

• *Carbonated beverages are "soft, safe and sane," says the industry. But with a jigger of gin and a twist of the wrist you can make them stiff, stimulating and stupefying.*

• Leading women culinary experts are helping to rewrite the Army's cookbook. But each company cook probably will still feed the boys his particular idea of a mess.

• *Wine is being used medically in New York hospitals as a builder-upper. So a sick man now has wine and women nurses. Which might also make him want to sing.*

• Quick freezing as done by Birds Eye is going into the movies in a "Popular Science" short. They ought to have Hedy Lamarr demonstrate how to thaw out the stuff.

• *Large size California navel oranges are plentiful now for the first time in many years.—Good news comes in small doses these days.*

• There are enough spices in the country to tickle sensitive American palates for two or three years, says the government. Fine, fine. But what do we do during the other two or three years of the war?

F.K.L.

unawares. It will be years before the order is given to cease firing.

Labor To Be Short

By every calculation, however optimistic, there is going to be a labor scarcity as soon as the conversion of peacetime industries to war production is completed. Men in particular will be in demand. You might as well begin now to study the best ways to employ women to replace those men who are drawn into the armed services or into war industries. Get out your copy of the June, 1939, FOOD INDUSTRIES, and read on page 315 a summary of the problems to be met. The subject is also discussed elsewhere in this issue.

Seasonal branches of food manufacture will be the more difficult to handle. Forehanded management will make adequate preparations to secure needed workers. If your public relations policies have been good the job will be relatively easy. If, however, they have not been good you will soon learn the economic cost of low public esteem. In 1917 it was not uncommon to see women drive to factories in expensive cars, put on an apron, punch the time clock and really go to work. But we observed that this occurred only where the management was popular with the public and where a friendly atmosphere prevailed.

Dead Convention?

"These conventions are dead; they lack life and spirit" was one gratuitous comment relative to the many food industry conventions in Chicago during the last week of January.

If the absence of playboys and rollicking mobs charging up and down hotel corridors at all hours of the night was the criterion of deadliness, then the commentary was undoubtedly correct. But one who looked beneath the superficialities could have noted the relative absence of food salesmen. Most of the conventioners were top executives and production men.

Facing grave problems, nobody was on a holiday. In fact, the general sessions of the National Canners Association were solidly packed with many unable to get inside the room to hear what the government expected of them. Which is something that has never occurred before.

One who knows many brokers by sight could spot a large number of them milling around the Stevens Hotel, apparently looking for canners who had something to sell—vain hope. Ordinarily the canner has been looking for brokers to sell a surplus on a weak market.

Yes, it was a dead convention. It was deadly earnest.

Research in Wartime

How to keep highly trained research personnel is bothering many a research director and many a food company. One concern has realized that it cannot possibly hope to retain its entire research staff under today's emergency. So it has reclassified all its research under three headings:

Emergency, which covers all work done on war contracts, or in anticipation of war contracts.

Immediate, which embraces all research where final results are predictable in the near future, after which the project can be dropped.

Continuous, to take in all research that is carried on continuously as routine policy and from which definite worthwhile results are not to be predicted on any specific date.

The latter, continuous research, is usually the kind that brings the biggest results in the course of time, but is the most difficult to "sell" to the local draft board.

By breaking down the various projects into these easily understandable categories, the draft board is enabled to understand better the value of research men to the war effort.

Two New Trade Associations

The long-awaited organization of the frozen food manufacturers took place in Chicago in January. The industry is to be complimented for avoiding the blandishments of outside organizers who for several years have been hovering on the fringes trying to corral the industry; also for taking the initiative when the need arose for an industry-wide trade association. It will be known as the National Association of Frozen Foods Packers.

To serve the dehydrators, another new association, the National Association of Dehydrators, was also organized in Chicago in January.

Both new organizations were created by the wartime needs of the government and the respective industries.

For some years many have expected the National Canners Association to open up a frozen foods division, inasmuch as many of the commercial freezers of fruits and vegetables are also canners. But apparently this is not to be permitted, which may ultimately be a cause of regret, for if the war drags out over many years and metal food containers are restricted as to use, there is likely to occur a compensating increase in preservation by freezing or by dehydration. Even dehydration appears to be likely to find its greatest wartime expansion among the canners. Thus two associations of the food industry may develop at the expense of the original parent body, even though all three serve an identical purpose—food preservation.

Prepare Adequate Warehouse Space

Under the Army's new purchasing plan for canned foods whereby no goods may be shipped to customers until the Army's quota has been accumulated, some acute storage problems will develop. Relatively few plants have ample storage space for large accumulations, and unless the government buying agencies inspect and accept the goods, and order shipment promptly after their production, you are going to see one of three things occur. Either you will see goods shipped to public storage at your own—not government—expense, a wild scramble for local storage space, or you will congratulate yourself that you had the foresight to make the necessary arrangements far ahead of time.

It might turn out that 1942 would be a big crop year.

Think it over.

Never Stop Selling

Judging by the way some companies are dropping salesmen and curtailing sales promotion, there must be some unwarranted optimism about the job of getting back into business again, or else some undue pessimism about the outcome of the war.

Smart management of concerns that are sold out for a long time to come are discovering ways to sell their name and services without taking orders.

FOOD PLANTS PREPARE FOR AIR RAIDS

By THOMAS ROBERT EDWARDS, JR.
San Mateo, Calif.

Precautions being taken against bombs, blackouts and sabotage revealed by interviews. Some say "It can't happen here," but managers by and large are doing utmost to prevent being caught unprepared. The article tells about several practical precautions

For blackout and for protection against flying glass, a large bakery has installed plywood over its windows, inside. Sliding panels permit the lower two-thirds of a window to be half open to light, and sliding panels in the upper section allow windows to be opened for ventilation. Deep panels cover all sliding joints and abutments at the ends to keep any light from escaping. Paper tape seals joints between wood and brickwork.

WHAT to do in the way of air raid precautions and provisions for blackouts is a big problem on the Pacific Coast, especially around the San Francisco Bay area. And to find out what preparations are being made by the food industries in that territory, plant superintendents in representative firms were interviewed. Such enterprises were selected as would reflect the general situation throughout the local food industry. The companies included a large baking company in San Francisco, an important dairy, a big coffee and spice business, two large canned goods packers, a big meat packer, a sugar refinery, two wholesale grocers and a commission merchant. The latter two groups were included because it was felt that any interruption in the process of distributing foodstuffs to retailers, and thence to the public, can be just as serious as an interruption in a factory.

There was the widest possible variation of opinions held and action taken by these different firms. The coffee firm felt secure in the belief that "It can't happen here." Their building is well built, though not of class "A" construction. And the management felt that, since the place is closed at night, no blackout provisions would be necessary. They were also convinced that if there should be a daylight air raid, it would be foolish to herd everyone into one room in the center of the basement where a direct bomb hit would kill them all. However, they have had fire drills.

At the other extreme, the bakery, which occupies an old brick and wooden building of obvious group risk, is the best prepared establishment on the list, with everything which can be foreseen provided for. The sugar refinery, a series of fine buildings, is a close second, and will, when its program is complete, probably surpass the bakery.

In between these two extremes are the canners, who have several months to wait before they need to do anything. Meanwhile, they are studying what others are doing.

While much of this problem consists of interdependent elements, it can be broken down somewhat for the purpose of analyzing what can be done, with an eye to the future. The management must protect: (1) Its plant, machinery, materials and utilities; and (2) its personnel.

Loose Objects Hazardous

Under the heading of plant protection come walls, roof, skylights and windows. The removal of loose objects, junk, and what-not from near walls is a good step to take, as such things are inclined to fly around in the air when struck with explosive force. Old rags, piles of waste paper, old bags, and so forth, are potential spreaders of fires at all times, and would be no help to a fire warden fighting an incendiary bomb.

In almost all the plants and offices visited, the roofs, fire escapes, stairways and halls were dotted with sand buckets, filled with *dry* sand. One of the canners added a nice, new, shiny fireman's axe to each bracket holding the buckets, and put removable wooden caps over the spiked heads to prevent casual injury to passersby.

Sliding Panels Blackout Windows

The baking company installed 300 pieces of 4x8-ft. plywood, using about 1,000 board feet of 1x12-in. lumber for mountings, battings, and so forth, which they cut to measure as they needed it. Paint had been tried on the

windows before using the plywood, but it didn't stick, and the glass was inclined to crack when the sun beat upon it. Their entire ground floor is thus equipped, and the panels are in halves which slide past each other in upper and lower grooves. Thus they enjoy half daylight, yet are completely blacked out at night. Also, should a bomb strike outside, the plywood will catch the flying glass, and in turn, give way before the force of the explosion. Those inside are, to that extent, protected. Office windows upstairs are heavily draped, and the panes of glass partitions are thoroughly taped with 1-in. adhesive tape, 4 in. apart, in a square lattice pattern.

On the roof, 100 ft. apart, are a number of 50-gal. lard drums, filled with sand. Each drum has four buckets close by, for bailing purposes. Between 25 and 30 men, carefully chosen for their known good citizenship, have been selected and trained as fire wardens and assigned definite posts and duties.

Every effort has been made to safeguard uninterrupted production. If the electric power should go off, an electric standby plant, with steam always up, is ready to take its place. However, should a bomb cause short circuits, magnetic switches cut their respective units off, so that a restoration of power will not start the plant going again until they have been reset. If the gas goes off, an oil standby will keep the ovens going for the completion of a 4-hour production line. In the meantime, no new mixes are started until there is assurance of normal progress. This prevents the loss of materials in process.

Water Tank Sealed

The water supply is guarded in a sealed tank. The seal is of tar paper. Frequent inspections by three shifts of watchmen would soon disclose any disturbance of the seal, and quick tests would show up any contamination. Any material prepared with that water would be condemned immediately.

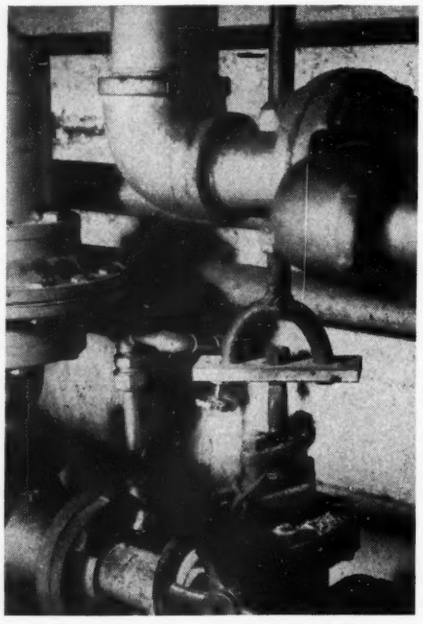
Instead of turning off all gas at the site of the main valve, down in the basement, a series of long rods and universal joints connect that valve with a point outside the building, where a wrench will do the job from a distance.

The entire crew has been organized on a progressive basis. Thus, if the delivery platform area should be bombed, the men in the wrapping room would go out there to rescue any drivers or others caught in the wreckage or otherwise rendered helpless. And they would also protect property from chance looting by passersby.

The warehouse, formerly open to visitors, is closed to all but a limited number of employees. Inspection of materials, such as flour, has been stepped up from one sampling to a carload to one for each 100 sacks. This latter measure has been taken by the milling companies, and while it doesn't concern air raid precaution it does render sabotage more difficult.

No provision has been made for a common air raid shelter for the employees. No spot in the structure is any safer than any other, and it has been thought more prudent to keep the people scattered in their own departments than to concentrate them at a point where a direct hit would kill the entire number.

The matter of first aid is being worked out, and several girls are now taking courses. The rather spotty production of instructors throughout the Bay area has held this particular plant back in this respect, but before long that last step will be completed.



The main gas valve in the basement of a bakery has been rigged up so that it can be turned off from outside the plant in case of an air raid. A yoke fits into holes in a plate on the valve shaft and turns the shaft through a series of rods and universal joints.

Has Underground Tunnel

The dairy is housed in a fine, class "A" structure three stories high, but with an enormous number of windows, many of which are too large to be blacked out. (One of these is between 50 and 60 ft. high, and about 25 ft. wide.) They plan to rely principally on evacuation to an underground tunnel in event of a daylight air raid. They do not operate with anything like a full staff at night. Barrels filled with 500 lb. of sand have been placed at convenient points, as an additional weapon in fighting incendiary bombs over and above the many extinguishers already installed.

Not only have schedules of fillings and deliveries been altered to favor daylight operation but arrangements have been completed among all the dairies of San Francisco, whereby other concerns will take over the production and delivery requirements of any plant that has been damaged.

No standby generator is provided to take up the electric load if that form of power should fail. The plan is to have the shift engineer pull the master light switch; then the switches leading to all machinery; then turn off all valves of steam engines, pumps, refrigerator compressors, etc. Then the plant will be evacuated to the tunnel. Each bookkeeper has charge of her own particular ledger and tributary records, which she puts away in one of three vaults before leaving the department—a matter of a few moments.

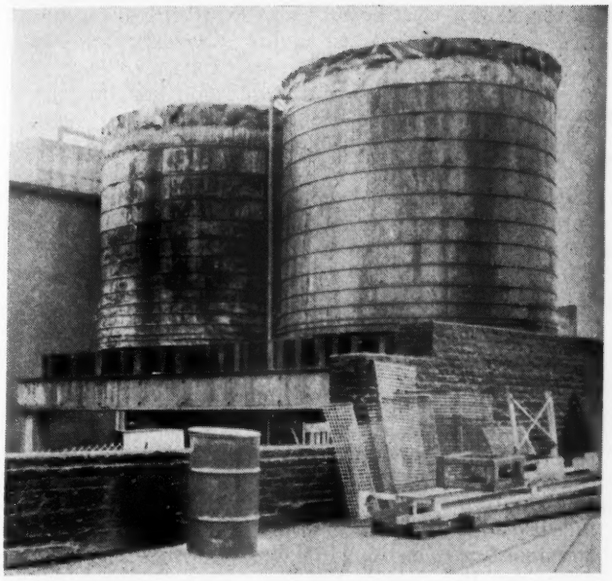
The water supply is had partly from city mains and partly from wells. The storage tank is well housed on three sides and by a roof of steel and concrete construction, and is accessible only from inside the plant.

The third first-aid class is just finishing its course, and the 55 members of it bring the total of people trained in this work to 75.

Canners Consider Problem

Neither of the canneries has done much to protect its packing plants, as yet, except as to fire hazards and water supply. Sandbags and firemen's axes bristle all over the offices and plants, and wire fences and frequent rounds by an increased staff of watchmen serve to take care of the water tanks. The scattered isolation of these plants is in their favor, out in the country regions as they are. They are one-story buildings, and so would be evacuated in the event of an air raid. All lights would be turned out by the engineer, except a few blue bulbs, for finishing what is in the cookers, with nothing fresh being prepared until the raid is over. The engineer would use a covered flashlight for seeing around the boiler room.

The plants are full of large, multipaned windows, too many to black out. Much activity is carried on outside at night with the aid of artificial light—loading and unloading, weighing, and so on. Inside, steam from the cookers is expected by one canner to be a serious problem, if windows are closed by blackout means. Oil standby is available to keep up steam for the pumps and cookers, if the gas should fail; the supply of gas and electricity is dependent upon the power company. Both



As a precaution against sabotage, tar paper is used to seal the water supply tanks of a bakery, the paper being tacked down around the wooden walls of the tanks. Frequent inspection will discover any tampering immediately. Also seen in the picture are barrels of sand for extinguishing incendiary bombs. Barrels are covered to keep sand dry. Buckets are provided for carrying sand.

operators interviewed are studying the problem through their engineering and operating departments, and have several months yet before their plants will be opened and protective measures put into full effect. Meanwhile, office workers are studying first-aid, and kits have been installed at convenient points.

The meat packing plant has the normal blackout, wall and roof protection of a refrigerated room. Naturally, there are no windows or exposed doors. Some windows, in other parts of the buildings, such as certain offices, have been protected. Many sand buckets have been added, and all are placed outside—at doors, stairway landings, along rooftops, cattle runways and elsewhere.

Changes Loading Hours

The management feels that evacuation is their best protection, although it happens that their plant is a mile from town—a long distance when bombs are falling. The loading hours have been changed in favor of daylight, and curtains have been provided to cover the truck doors and loading platforms leading to the packing house proper, so that night loading during a blackout is possible.

Power comes from the public utility, and no standby generator is available. However, oil standby is provided, should the gas fail. Water comes from the 18-in. city mains, and there is no storage tank. There has been some instruction in first-aid, and more is planned. Guards have been increased from two to five per shift to allow the older and more experienced guards more time to "freelance" around the grounds, docks and through the plant.

The sugar refinery will have the most complete and perfect set-up of all, when it reopens. Their means of blackout protection has not been worked out yet, but their buildings make their own protection as far as machinery and personnel are concerned. Better still, they have organized the men who are to have certain duties during emergencies in such a way that each one knows just what he is to do—and when and where and how.

Ten floors of concrete between the sky and air raid shelter ought to be enough to stop any bombs that the Japs might drop. Such is the main building of the plant, where most of the operations are carried on. There is also a warehouse half buried in the ground, built of 18-in. concrete, with a concrete roof and two concrete floors for shelter. All warehouse windows have been boarded up. The entire staff can gather in either of these places, with a guarantee of safety from explosive bombs, of good ventilation, and a supply of light, heat and water—also, adequate toilet facilities.

A standby generator is in readiness, should the electricity fail. A gas standby is ready to furnish heat, should the oil burners be put out of commission, through damage or electric power failure. Sandbags and buckets are well distributed. A signal system hooks in with the general city alarm system, through the power company's substation next door. And the gateman has a double warning signal, one for the shift engineer, and the other for the plant in general, so that, in three minutes or less, every person is either at his appointed place of safety, or at his post carrying on his functions for the emergency.

Fire Protection Taught

Ten fire wardens are assigned from each shift. Large classes are being taught fire protection, especially the use and care of fire extinguishers and the treatment of fire bombs. On account of the many different views on how to extinguish incendiary bombs, the management is relying on the advice published in a recent English pamphlet reprinted in this country.

On the sounding of the alarm, the shift engineer pulls the master switch on everything except the vacuum pans, centrifuges and fire pumps. These must continue to operate, for obvious reasons. The former two, however, need operate only until their respective functions for the particular batch concerned shall have been carried through to completion.

Classes in first aid are being conducted, with fire wardens for first participants. Special patrols have been set up for blackout duties and extra policing. Three extra men have been added to the staff of watchmen on each of the three daily shifts.

The accompanying chart shows the organization which has been set up, according to functions.

The wholesale grocers in San Francisco had taken no steps at all, because the building which houses nearly all of them had not, at the time of the interview, been inspected by the authorities.

Commission merchants handling fresh fruits, vegetables and poultry have done nothing, except change their hour of opening from 2:00-3:00 A.M. to 7:00 A.M., on account of blackouts.

EXECUTIVE COMMITTEE

COORDINATOR

LAW & ORDER	FIRE PROTECTION	LIGHT, POWER, COMMUNICATIONS	VITAL FACTORY OPERATIONS	FIRST AID, MEDICAL
Shift Supt. Asst. Supt. Spec. Patrol Reg. Watchman Gateman	Shift Supt. Asst. Supt. Fire Marshal Fire Squad (5)	Shift Supt. Asst. Supt. Shift Electric. Turbine Oper. Helper	Shift Supt. Asst. Supt. Water Tender Fireman	Shift Supt. Asst. Supt. Shift Chemist 1st Aid Squad

Organization of personnel for air raid protection, as set up by sugar refinery.

ARMY NEEDS 13 NEW FOODS*

By MAJOR JESSE H. WHITE
Q.M.C., Chicago, Ill.

Challenges industry to aid in perfecting additional new items to vary soldiers' diet. Thirteen new ideas cited which met with Army's approval

THE Army challenges the industry to aid in perfecting additional new canned meat items. In order that you may all have some concept of Army needs, let me tell you of some of the things we desire and hope to develop:

1. The meat units of the Type C Field Ration—meat and beans, meat and vegetable hash, and meat and vegetable stew—have proven highly satisfactory. But in the interest of greater variety, the Army wants three additional meat items for this ration. Like the original three, these items must be palatable either cold or hot, should have a fair calorific value and should be sufficiently different in flavor to give variety to the meals.

2. Two of the meat components of the Type K Ration—veal luncheon meat and pork luncheon meat—are so nearly alike that it is believed desirable to substitute a different item for one of them. The cervelat component, also, is not ideal for this particular use, and a substitute is desired for that unit.

3. A liver product is highly desirable to secure the nutritive constituents of that products.

4. It is believed that more work should be done on sterile canned hams. As with 6-lb. cans of pork luncheon meat, the Army is hesitant to accept canned hams that might not withstand the abuse of exposure to tropical heat without refrigeration. Considerable work has already been done with this item, and the Army has made a sample shipment of approximately 4,000 lb. of so-called "sterile hams" to one of our overseas posts. Reports should soon be forthcoming to indicate the stability of that product.

5. The present method of preparing canned pork sausage, both in bulk and in links, results in a product that is very wasteful, since approximately one-half of the contents of the can is thrown away or is of little use in the field, due to the rendering of fats and moisture from the meat during processing. In addition, the flavor of the product bears but little resemblance to that of fresh pork sausage. The Army would welcome a change in the method of preparation of this product with a view to avoiding excessive waste and improving the flavor.

6. So-called "roast beef" is received with considerable favor by Army messes. It is believed, however, that this product can be improved upon both in flavor and consistency.

7. Because of the highly nutritive value of eggs, it was hoped that eggs could be incorporated with other foods in a canned item. Experiments made by the Subsistence Research Laboratory have not offered much encouragement in this line. Eggs do not stand processing temperatures well, since they become hard, leathery, and discolor badly. They do not combine well with bacon. The best combination yet found at the Research Laboratory was one of egg, chopped ham and potato cubes. This combination may be developed into a satisfactory product.

8. Canned chicken and canned turkey for hospital use are definite needs. It is believed very desirable, however, to develop a product with a much higher percentage of broth than the solid-packed product produced at present for FSCC.

9. Outside the particular realm of the canned meat industry, the Army desires a sterile, canned, whole milk

Wide World

Major Jesse H. White examines a "defense ham" and a slab of "defense bacon." Developed by the Quartermaster Corps Subsistence Research Laboratory at Chicago, these products are well cured and well smoked to make them keep longer than ordinary commercial ham and bacon. Meat packers follow Army specifications in preparing them. Food processors are urged to develop products such as these which meet special Army needs.

* From a paper presented before the Meat Section of the National Canners Association Convention, in Chicago, January 29, 1942.

without the distinctive overcooked taste of evaporated milk. This is particularly desirable for field use to provide a palatable and nourishing milk beverage where fresh milk is unavailable.

10. Of considerable importance at the present moment is the development of a spread for bread for use by expeditionary forces, particularly to tropical countries. This product must be able to withstand rather high temperatures, have a higher melting point than butter or oleomargarine, and must be packed in tin.

11. With the curtailment of the nation's supply of tin and the enormous demands placed upon our reserve stocks by the war, conservation of tinplate is highly desirable, and may soon become a dire necessity. The preparation of partially dried, or of desiccated meats, protected by containers or coverings other than tin, may deserve consideration.

12. The Subsistence Research Laboratory has been directed by the Office of The Quartermaster General to develop a special "Mountain Ration," suitable for use in extreme cold, to be eaten at times without facilities for heating, prepared from products and in containers not affected by freezing. Suggestions for such items will be gratefully received.

13. The Subsistence Research Laboratory has been directed, also, to prepare a ten-ration package to simplify distribution of rations at division distribution points. This involves the selection of containers that will stow well and economically in a box or other package, the selection of foods that will give adequate variety and palatability as well as nutritional balance, and the selection of an outer container of proper dimensions and stability. The tin cans or other containers should be of such size as to approximate the requirements of the particular item for ten men. Here, again, suggestions will be gratefully received. The need is not for meat items alone, but for any ration item. In the interest of variety, it is desired to develop varied rations to be issued on successive days.

The above suggestions are made for your consideration. Your help is solicited in the development of one or more of these products.

13 Ideas That Clicked

Investigation should not be confined to these items alone, since you, undoubtedly, have many suggestions of your own. In fact, many have already been made by members of the industry, notably the following:

1. Pork sausage patties, fried before canning. These lose but little in processing, and they taste like pork sausage. The seemingly high cost of this product is largely offset by the waste in Army canned pork sausage. Slowness of production is the greatest objection to this product.

2. Several liver combinations have been offered, sufficient to indicate that a suitable product might be in the offing. We are particularly anxious to develop this product.

3. Beef and noodles has been offered as one of the three additional items for the Type C Field Ration. It is favorably considered not only for this purpose, but for mess use as well in No. 10 cans. Samples submitted have been highly satisfactory.

4. Pork hash has great possibilities.

5. Corned pork and chopped ham are already in production and are receiving consideration.

6. A concentrated soup stock or gravy made from bones has been offered by at least two members of your group. This product requires some further development, but may be found advantageous in the field, where boneless beef is being used.

7. A meat and spaghetti product has been developed as one of the three additional meat items for the Type C Field Ration. The Subsistence Research Laboratory considers this a desirable product, but as yet it has not been approved.

8. Hungarian goulash, prepared under an original Old World formula, has been prepared and presented for consideration. It is believed that this product might have greater Army acceptance than chili con carne.

9. Canned Mortadella sausage meat has been offered as a substitute for the cervelat in the Type K Field Ration. For field use it probably would have acceptance equal to that of cervelat.

10. A beef and rice product has been presented. It is doubtful if a rice product can be made entirely satisfactory. Experiments with rice made at the Subsistence Research Laboratory do not indicate that this product lends itself successfully to canning operations.

11. Samples of cheese and bacon and cheese and ham, using both smoked and unsmoked cheese, have been presented as substitutes for one of the meat items of the Type K Field Ration. It is believed that a very satisfactory product can be developed for this purpose.

12. Gelatine coatings for hams and bacon, and for fresh meats, have received considerable consideration and experimentation. But adaptation to Army needs has not been perfected.

13. Much experimental work has been done in packaging to lessen the present burden upon tin. Cellophane, Pliofilm, Cry-O-Vac, and many other materials, singly and in combination, sealed under vacuum and at atmospheric pressure, have been given extensive tests. Packages so prepared have been sent to the Philippine Islands, to Hawaii, and to Panama, and returned to the Subsistence Research Laboratory. Many of these have been satisfactory beyond our fondest hopes; others have proved worthless. It is believed that satisfactory coverings for products such as cheese, bacon, and hams will be developed that will resist moisture and gas penetration.

These are some of the problems now confronting us. While it is not absolutely essential that all of these problems be solved, yet their solution will aid in bringing this conflict to a quicker and more satisfactory conclusion by improving the well-being and morale of our men at the front.

Captain R. H. MacDonnell, Subsistence Research Laboratory, formerly chief chemist for A. & P., exhibits the breakfast, dinner and supper components of the Type K or "Para" ration. Originally intended for parachute troops, this ration is now in great demand by the air force, mechanized forces, motor troops and even the infantry, and it seems to fill the need of landing parties of Marines and Navy forces. (See "Food Industries," November, 1941, page 67, for list of foods in ration.) *Signal Corps*

Bottom Vents For Vertical Retorts

By O. F. ECKLUND and H. A. BENJAMIN

Both of the Research Department,
American Can Co., Maywood, Ill.

Studies of temperature distribution and steam consumption in vertical retorts show that the bottom venting method of retort operation is more efficient with respect to heat distribution, steam consumption and come-up time than the conventional method

HEAT processing of canned food is, without question, a most important step in the canning procedure. Should adequate sterilization of the can contents fail to be accomplished, the raw materials and labor put into the finished product are lost. Much scientific study has been devoted to the derivation of the proper heat treatments to be employed for various types of foods and individual food products. Considerably less attention has been given to methods of connecting and operating cannery retorts to insure that all cans in a retort load will receive the full effect of the intended process.

The primary requisite of good retort operation is attainment of uniform temperature distribution throughout the retort from the instant the retort thermometer registers the holding temperature until the end of the cook. To attain uniform heat distribution throughout a retort, it is necessary to eliminate all the air from the retort. Air trapped in the mass of cans in a retort produces "cold spots" which are often many degrees below retort temperature. Slower heating of the cans in that area results, with consequent danger of understerilization. The ideal method of retort operation would obviously be one where all of the air is eliminated from the retort during the "coming-up" period.

Although retort equipment and hook-ups vary in detail, the conventional principle of operation calls for the steam to enter the bottom of the retort with the air being vented from the top. Steam, being much lighter than the air in the retort, rises rapidly in the free space around the retort crates and collects in the top of the retort. Therefore, the vent in the top of the retort instead of venting air largely vents steam. Some years ago, Dillman suggested that the relative positions of steam inlet and the vent should be reversed to take advantage of the difference in gravity of air and steam. In this case the steam would enter the top of the retort and the air, being heavier, would be more easily displaced downward and out at the bottom of the retort. It would appear, therefore, that bottom venting should provide better elimination of air with less loss of steam through venting.

A further steam economy should be effected by the bottom-venting method because of the fact that much of the condensate is removed from the retort at a temperature far below retort holding temperature, and, consequently, steam is not required to bring this condensate up to holding temperature. Since most of the steam economy is effected during the come-up period, it should result in a somewhat reduced come-up time.

To evaluate the principle of bottom venting as compared to conventional venting from the top of the retort, a series of heat-distribution tests was carried out in an experimental retort. At the same time, steam consumption values were obtained for each run.

Experimental Conditions and Results

The standard three-crate vertical retort used in making the tests was piped so that it could be operated either in the conventional manner or on the bottom-venting principle. The essential features of the hook-up employed when the retort was operated in the conventional manner are illustrated in Fig. 5. The steam entered through a 2-in. line and impinged onto a baffle plate. Venting was accomplished by means of a ¾-in. blow-off and a ⅛-in. petcock, both located on the top of the retort, and a ⅛-in. petcock located on the thermometer well.

When the retort was operated on the bottom-venting principle, with the

SUMMARY AND COMMENTS

These tests show that, for vertical retorts, the bottom-venting method of retort operation is more efficient with respect to heat distribution, steam consumption and come-up time than the conventional method. Dillman's contentions[1] concerning bottom venting are, therefore, well substantiated.

While equally good results were obtained with automatic or carefully controlled manual venting from the bottom of the retort, certain precautions should be taken to prevent the accumulation of condensate in the bottom of the retort if manual operation is to be used. It will be noted that when the bottom vent is manually operated, the only manner in which condensate can escape after the vent is closed is through the bottom petcock. This should be located as shown in Fig. 6, in such a position that it could not be overlooked by the retort operator. A continuous discharge of water from this bleed would indicate the presence of condensate in the bottom of the retort and condensate should then be discharged by opening the ¾-in. valve until steam appears. Accumulation of condensate could also be prevented by the installation of almost any type of steam trap in the drain line, providing a satisfactory air relief feature is incorporated in the trap to prevent air binding. Conspicuous location of the bottom petcock would be advantageous, however, regardless of how the condensate is eliminated.

Automatic bottom venting, together with automatic condensate removal, was very satisfactorily accomplished by means of a thermostatic trap set to close on a 2-deg. F. differential between steam and condensate.

hook-up schematically illustrated in Fig. 6, the steam inlet was located just below the cover on the same side of the retort as the thermometer well. Bottom venting was accomplished by means of a ¾-in. hand-operated blow-off connected to the drain line, or by means of any of several types of steam traps. A ⅛-in. petcock was also located in the thermometer well and in the drain line. The same retort and a load of 240 No. 10 cans of water was used throughout for both operating methods, the only change being in the piping.

Steam-consumption measurements were made by means of an integrating flow meter installed in the steam line to the retort. In making the tests it was necessary to throttle the steam during the come-up period so that the steam flow would not exceed the 2,000-lb.-per-hour capacity of the meter. Integrating flow meters are subject to some error in this type of operation due to their inability to follow rapid changes in steam demand. However, errors due to the instrument should be about the same for each test, and comparative results between different tests should be valid.

Temperature distribution throughout the retort load was measured by means of ten thermocouples located in different parts of the retort. The thermocouple lead wires passed out of the retort through a stuffing box and were connected through a switch to a portable potentiometer. It was possible by means of this arrangement to determine the temperature in almost any part of the retort at any time during a test.

The first series of tests to be described was made with initial can temperatures of about 75 deg. F., and the process used was 30 minutes at 240 deg. F. Tests made with high initial can temperatures will be described later.

The accompanying graphs show the heat distribution, coming-up time and steam consumption for seven different tests. The slowest heating area in each retort crate was found to be in the center of the crate; therefore, only those temperatures are shown. Curves 1, 2 and 3 on the accompanying graphs, Figs. 1 to 4, represent temperatures in the center of the top, center and bottom crates, respectively. The relative positions of these thermocouples in the retort are also shown by corresponding numbers on Figs. 5 and 6. The "steam-up" times on the graphs indicate the number of minutes elapsed before the retort thermometer read 240 deg. F. and the retort pressure gage indicated the corresponding steam pressure. Steam consumption values shown are the averages obtained for several runs of each type for the 30-minute processing period.

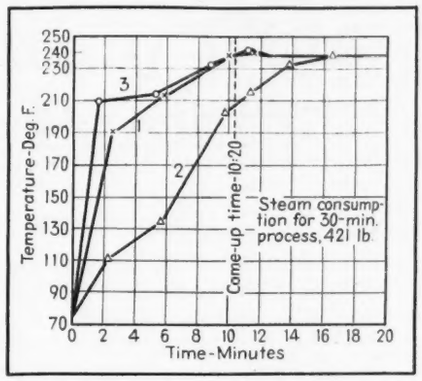


Fig. 1A. Conventional method of retort operation.

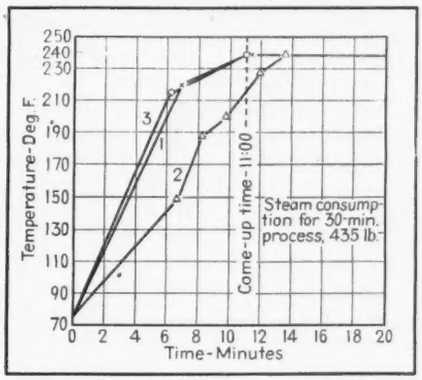


Fig. 1B. Conventional method of retort operation.

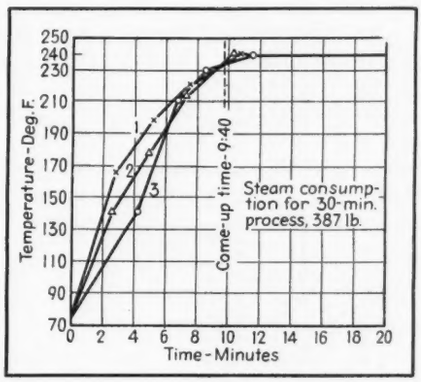


Fig. 2A. Bottom venting by means of hand-operated valve.

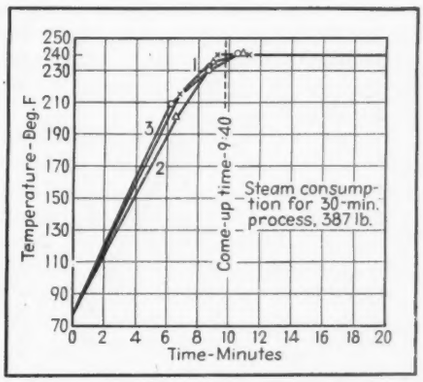


Fig. 2B. Bottom venting by means of hand-operated valve.

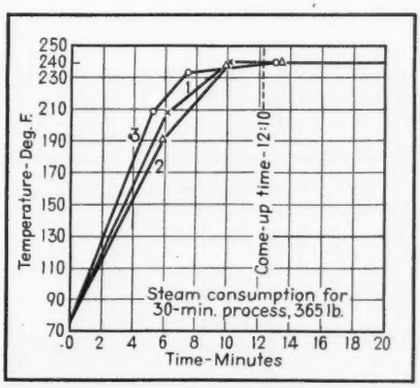


Fig. 3A. Automatic bottom venting by means of thermostatic steam trap.

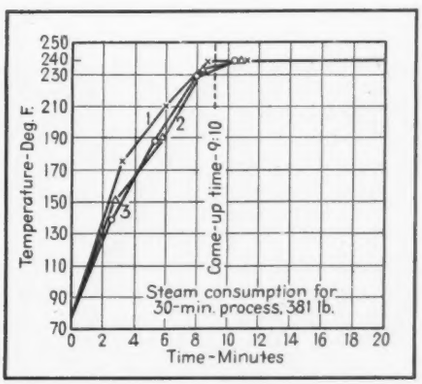


Fig. 3B. Automatic bottom venting by means of thermostatic steam trap.

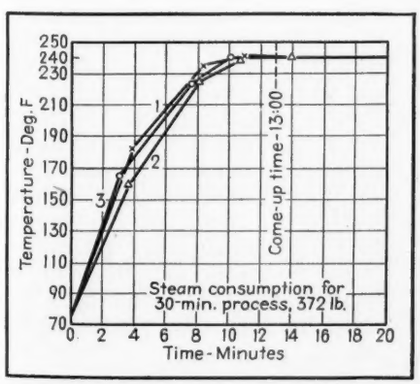


Fig. 4. Automatic bottom venting by means of combination float and thermostatic trap.

Test 1A—Conventional Method of Retort Operation. Steam was admitted at the bottom of the retort. Venting was accomplished by means of a ¾-in. blow-off valve on top of the retort which was kept open until temperature and pressure agreement was reached (218 deg. F. in this case). Petcocks on top of the retort and on the thermometer well were kept open throughout the run.

Figure 1A shows that an area around the center of the middle crate required about 5 minutes after the temperature was supposedly up before the retort holding temperature was indicated. It will be noted that at "steam-up" time the temperature in this area was about 30 deg. F. under retort temperature. In none of the tests where the retort was operated in this manner did any of the three thermocouples located in the middle crate reach the holding temperature until several minutes after the thermometer had indicated the holding temperature. Steam consumption was 421 lb. for the half-hour process.

Test 1B—Conventional Method. This test was made in the same manner as Test 1A except that the ¾-in. blow-off was kept open until the retort thermometer read 240 deg. F. (temperature and pressure agreement was reached at 220 deg. F.).

As in Test 1A, Fig. 1B indicates that air was trapped in the mass of cans in the middle crate, as low temperatures are indicated for about 2½ minutes. However, the additional venting did aid in removing some of the air. Coming-up time (11 minutes) and steam consumption (435 lb.) were both increased slightly by the additional venting although the differences shown may not be significant.

Test 2A—Bottom Venting by Hand-operated Valve. Steam was admitted at the top of the retort. Bottom venting was accomplished by means of a ¾-in. hand-operated valve which was kept open until temperature and pressure agreement was reached (240 deg. F. in this case). Petcocks on the drain line and on the thermometer well were kept open throughout the run.

Temperature distribution throughout the retort was excellent in this test. All temperature readings taken after steam was up were the same as indicated by the retort thermometer. Steam consumption (387 lb.) and coming-up time (9¾ minutes) were both less than in Tests 1A or 1B.

Test 2B—Bottom Venting by Hand-operated Valve. This test was made in the same manner as Test 2A except that the ¾-in. vent was closed when the thermometer showed 218 deg. F. (temperature and pressure agreement was not yet reached).

The results of this test (Fig. 2B) are almost identical with Test 2A, indicating that most of the air was eliminated when the vent was closed. Lack of temperature and pressure agreement during the come-up was probably due to the lag in the thermometer.

In both Tests 2A and 2B the only way that condensate could have been eliminated from the bottom of the retort after the hand-operated vent was closed was through the petcock in the drain line. In the following tests steam traps were used not only for the elimination of condensate but also to carry out the venting operation automatically. For the automatic venting operation, straight bucket or float type traps were found to be unsatisfactory. These tests were therefore conducted with thermostatic and combination float and thermostatic traps.

TABLE I

Test No.	Approx. initial temp. (deg.F.)	Retort temp. (deg.F.)	Temperature of slowest heating point at steam-up (deg.F.)	Temperature of slowest heating point 5 min. after steam-up (deg.F.)	Steam consumption, 30-min. test (lb.)	Come-up time (min.)
5	170–190	240	232	238	176	3:20
6	170–190	240	239	240	166	2:40
7	170–190	240	240	240	157	2:50

Test 3A—Automatic Bottom Venting by Thermostatic Steam Trap. Steam was admitted at the top of the retort. Bottom venting was accomplished by means of a 1¼-in. thermostatic (bellows type) trap set to close on a differential between steam and condensate of 14 deg. F. and to open on a differential of 17 deg. F. Petcocks on drain line and thermometer well were kept open throughout run.

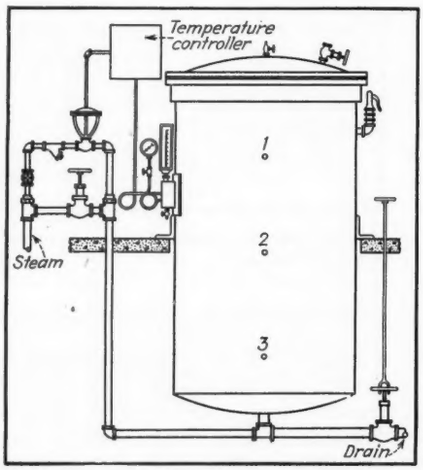


Fig. 5. Retort hook-up for conventional method of retort operation.

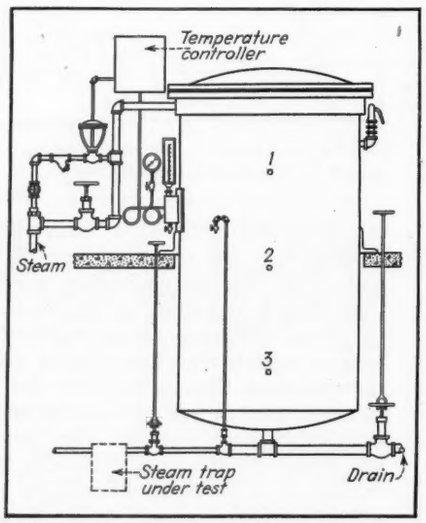


Fig. 6. Retort hook-up for bottom-venting method of retort operation.

Although the heat distribution throughout the retort was good (see Fig. 3A) the results of this test would not be considered satisfactory. The retort thermometer read 240 deg. F. after about 9½ minutes, but the retort pressure gage read high, indicating that there was still air in the retort. Temperature and pressure agreement was not reached until almost two minutes later. The come-up time was 12 minutes and 10 seconds and the steam consumption 365 lb. The inadequate venting in this case could be attributed to the fact that the steam trap closed on too great a temperature differential, a condition, which was changed in Test 3B.

Test 3B—Automatic Bottom Venting by Thermostatic Steam Trap. This test was made in the same manner as Test 3A except that, by the addition of two gaskets under the cover, the steam trap was adjusted to close on a 2-deg. F. and to open on a 6-deg. F. differential between steam and condensate.

Figure 3B shows that this method of operation provided adequate venting so that good heat distribution was attained. The steam-up time was not delayed by lack of agreement between the retort thermometer and pressure gage. Steam consumption (381 lb.) appeared to be significantly lower than for the conventional method of operation.

Test 4—Automatic Bottom Venting by Combination Float and Thermostatic Trap. Steam was admitted at the top of the retort. Bottom venting was accomplished by means of a combination float and thermostatic trap. Petcocks on the drain-line and thermometer reached 240 deg. F. in a little over nine minutes, but temperature and pressure agreement was not reached until several minutes later. Venting by means of this trap was, therefore, not adequate, probably due to the inadequate capacity of the thermostatic vent and the fact that it closed under too high a temperature differential.

Three tests were made in which the

(*Turn to page 96*)

Improved Firing Cuts Fuel Bill 38 Percent

By FRANCIS A. WESTBROOK
Mechanical Engineer, Benson, Vt.

Pneumatic spreader type stoker saves enough fuel at bakery plant to pay 43 percent on the investment in its first year of operation

TAYSTEE Bread Co., Indianapolis, Ind., has made an annual saving of around $1,600 in fuel cost by installing a new stoker that conveys the coal from the bunker to the firebox by means of hot furnace gases. This saving was made by an investment of about $3,750 for new equipment, representing a return of approximately 43 percent. The reduction in cost of fuel amounts to 38 percent.

This new pneumatic spreader stoker unit was installed to carry the plant steam load on one of two existing 100-hp. horizontal return tubular boilers equipped with an extra set of grates and fan to permit the alternate use of the boilers on a monthly schedule. That is, the one stoker can be made to fire either boiler. With this set-up, one boiler thus fired, last winter in subzero weather, easily carried the 200-hp. load. Previously, with underfeed stokers, it was difficult to do this under these conditions with both boilers in operation.

Alternate operation of the two boilers with the one pneumatic spreader stoker is accomplished by swinging the conveyor pipe from one boiler front to the other. The changeover requires only a few minutes. Each boiler is equipped with a below-grate fan, pinhole grates and the feed tube into the firebox. The hot gas pipe has a double intake, one in each combustion chamber. The intake not in use is shut off by a valve. The set-up is shown in the photograph.

An automatic volumeter controls the supply of below-grate air, this being adjusted to meet the changes in thickness of the fuel bed and the consequent air resistance. Other automatic controls regulate firing to meet steam-pressure needs.

The coal bunker is completely apart from the boiler room, which can therefore be kept as clean as any other part of the big bakery building. The spreader stoker uses the conventional worm and agitator to feed coal from the enclosed bunker to the pneumatic conveying system. There is no manual coal handling. A sizing or coal crushing section of the worm breaks the larger pieces of coal into proper size for pneumatic firing.

When the coal reaches the hot gas stream, which is drawn from the upper part of the boiler by a radial vane fan, it is blown along the feed pipe to the nozzle located well above the grates within the fire-box.

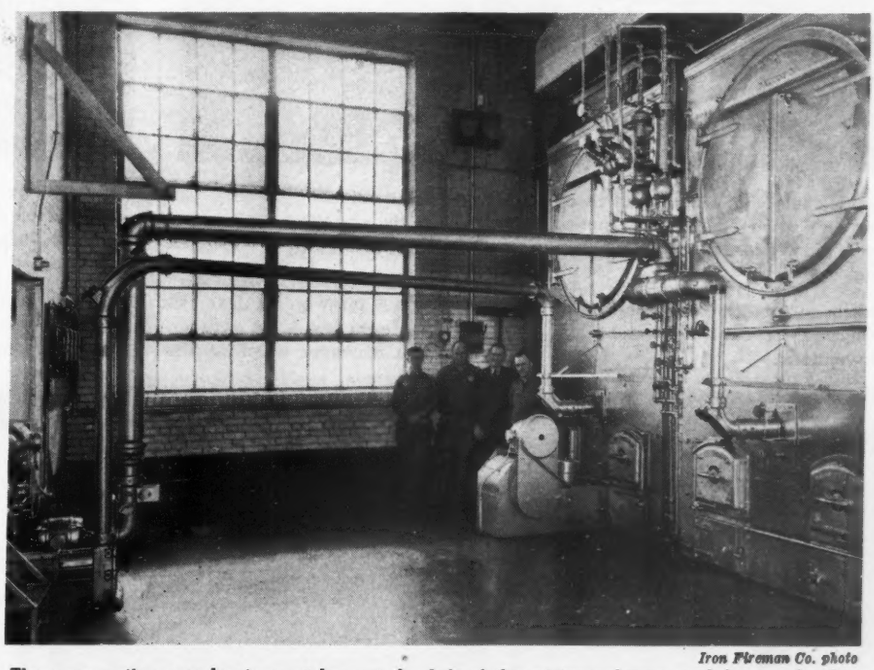
The grates are of the pinhole type, as is required for pneumatic coal firing. Another fan forces air from the boiler room up through the grates into the firebox where it meets the hot furnace gas on which the coal is blown, creating extreme turbulence in the combustion chamber. This turbulence above the fire bed assures proper mixture of coal and air for very complete combustion. The nozzle is arranged so that coal is distributed evenly over the fuel bed.

Fuel is Preheated

A feature of the hot-gas transmission of coal is that the fuel is preheated before reaching the firebox. Fines burn in suspension and the heavier pieces fall to the grates to form a shallow fire bed which permits the ashes to fall or sift through. The ashes are cooled by the incoming under-grate blast of air, thus preventing the formation of heavy clinkers that would block the pinhole openings of the grates. The method makes possible the efficient use of lower cost grades of fuel, thus accounting for a part of the savings noted.

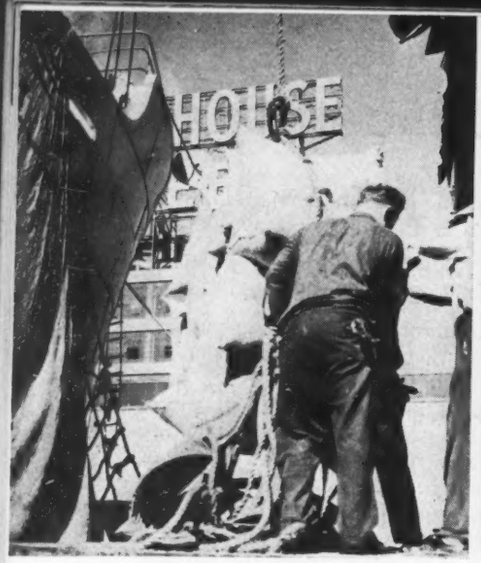
Ash removal is simple with this method of firing. Even with the lower cost coal, the ash is light because the higher temperature generated in the firebox burns the coal more completely. Ash is hoed from the stationary grates into an ash pit or into a wheelbarrow.

A check-up of the emission of fly-ash from the stack was made at a time when the roof was covered with snow. Careful observation over a period of sufficient time to include the various operating conditions encountered, from light loads to heavy steam demands, failed to show the presence of any such ash whatever. Nor was any fly ash to be found on the snow in the proximity of the plant.

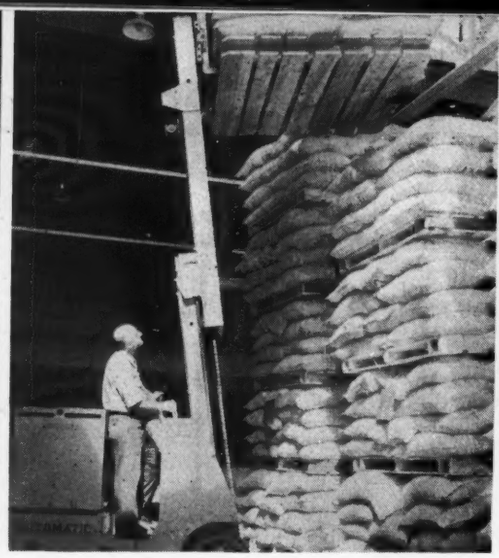


Iron Fireman Co. photo

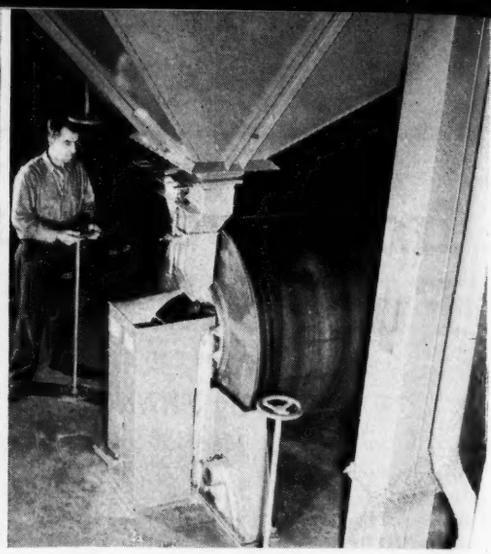
The pneumatic spreader type stoker, at the left of the picture, draws coal from a bunker entirely separated from the boiler room. It is arranged to feed either of the boilers by the simple shifting of the swing pipe extending across the boiler room. The upper pipe feeds hot gases from the boiler to the pneumatic conveying system of the stoker for preheating the fuel. Note the clear floor and clean appearance of the boiler room.



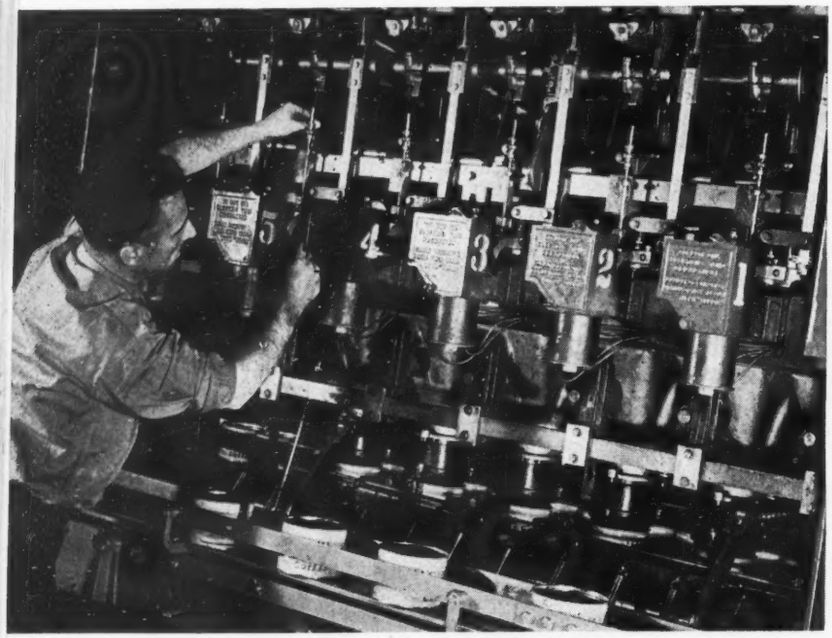
1 At the "Maxwell House" pier on the Hoboken, N. J., waterfront, stevedores hustle slings-ful of green coffee from a South American freighter. The 6-story modern plant, in the background, was built in 1939.



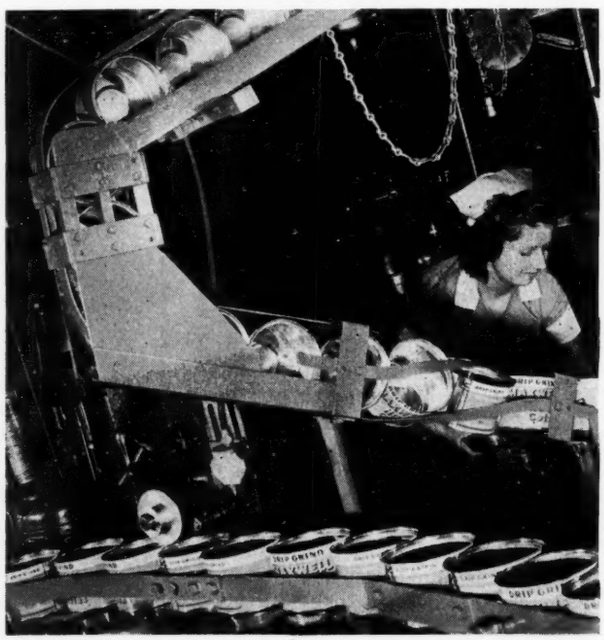
2 Green coffee from the ship being placed in a waterfront warehouse by tilting-tiering-telescoping electric fork truck. Ten of these are used. One of the trucks easily handles a 2-ton load of coffee.



3 Green coffee beans from various parts of the world, after being cleaned, are mixed in 20-bag blending drums, of which there are six in the plant. Careful mixing assures a uniform blend.



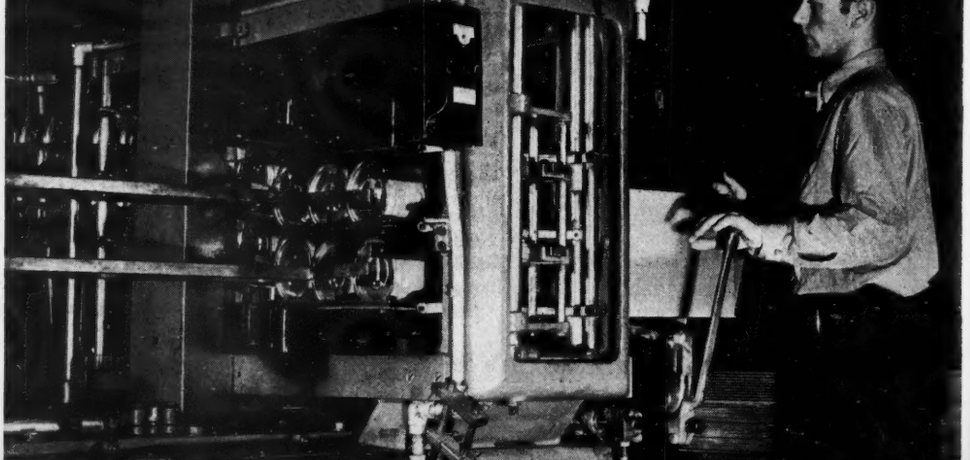
7 This machine fills coffee into cans at a rate of 85 cans a minute, filling six cans at a time. It automatically weighs out the correct quantity of ground coffee. Cans are automatically vibrated on conveyor during filling.

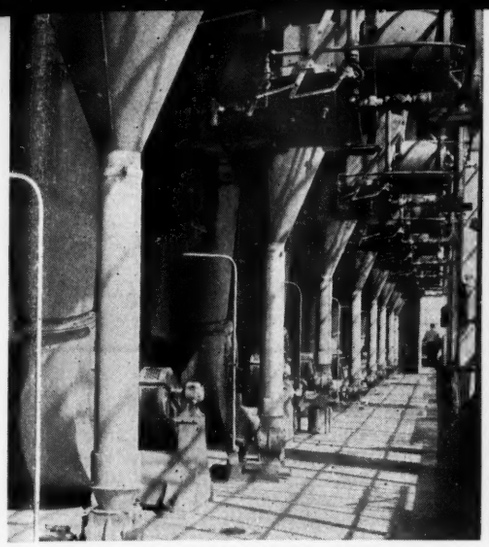


8 Two-way traffic carries empty cans to filler and full cans to vacuum sealing machine (left). Cans are inspected and turned upside down as final precaution before filling.

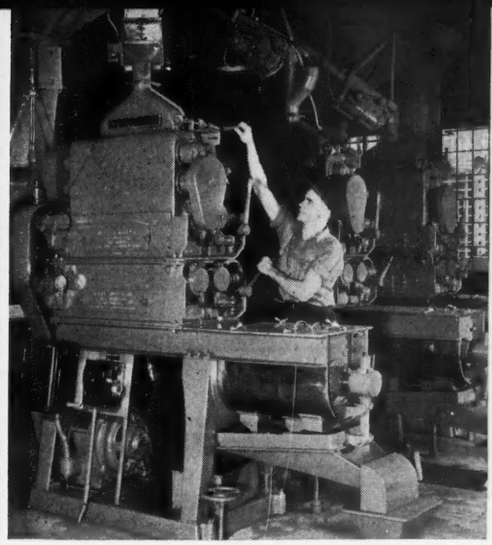
9 Cans taken at random are constantly being checked for accurate weight by this lady in uniform.

10 A push on the lever shoves six cans of coffee into carton held in place by operator's right hand. A second push fills the case, and the container drops automatically to a belt conveyor which carries it through a carton sealer.





4 Battery of roasters, as seen from firing end. Cone-shaped separators keep the recirculating air free of the chaff released from coffee beans during roasting. Roasted coffee goes direct to airblast coolers.



5 After cooling, the roasted coffee beans are conveyed to special two-stage granulizers. Magnetic separators protect these machines from any metallic objects that might happen to be in the incoming coffee.

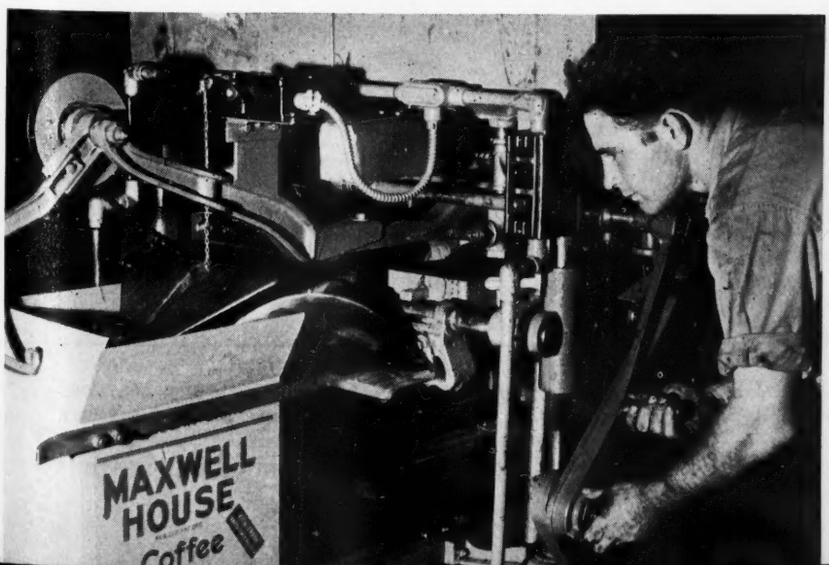
6 "True-flow" bins, or mechanized hoppers, feed the roasted and ground "Maxwell House" coffee rapidly, but evenly, to high-speed filling machines which stand in batteries on the floor below these hoppers.

PICTURES OF PROCESSES

● It is the world's largest coffee plant—producing enough coffee in an hour to make 1,500,000 cups. But more than that, the Hoboken home of "Maxwell House" is a model of food factory efficiency. As such the equipment and methods employed there by General Foods can profitably be noted by others in the food field.

PHOTOS COURTESY OF GENERAL FOODS CORP., NEW YORK

11 Carton enters sealing machine. Arm at left is about to fold one flap down, the opposite flap being pushed down at same time. In a plow-like movement the side flaps are folded and sealed.



12 Electric lift truck carries cartons of coffee from shipping floor to freight cars on the General Food's siding.

New—Nectar Made From Fresh Prunes*

By C. W. EDDY** and M. K. VELDHUIS

U. S. Fruit and Vegetable Byproducts Laboratory, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, Pullman, Wash.

Fresh Idaho prunes form the basis of a new product—prune nectar. This development offers an opportunity for canners seeking to add to their line, as well as an outlet for cull prunes

IDAHO'S production of Italian prunes has averaged 15,000 tons during the past five years, with a maximum production of 20,000 tons in 1939. Of the total production during these years, from 400 to 1,200 tons were culls. The total average production during the next five years can be expected to exceed the past five years average. This is due to the increased plantings of new trees. The use of cull prunes in the manufacture of suitable byproducts will not only bring increased returns to the grower for this portion of the crop, but will remove the cull fruit from competition with the higher grades of fresh fruit and have a stabilizing effect on the fresh prune market.

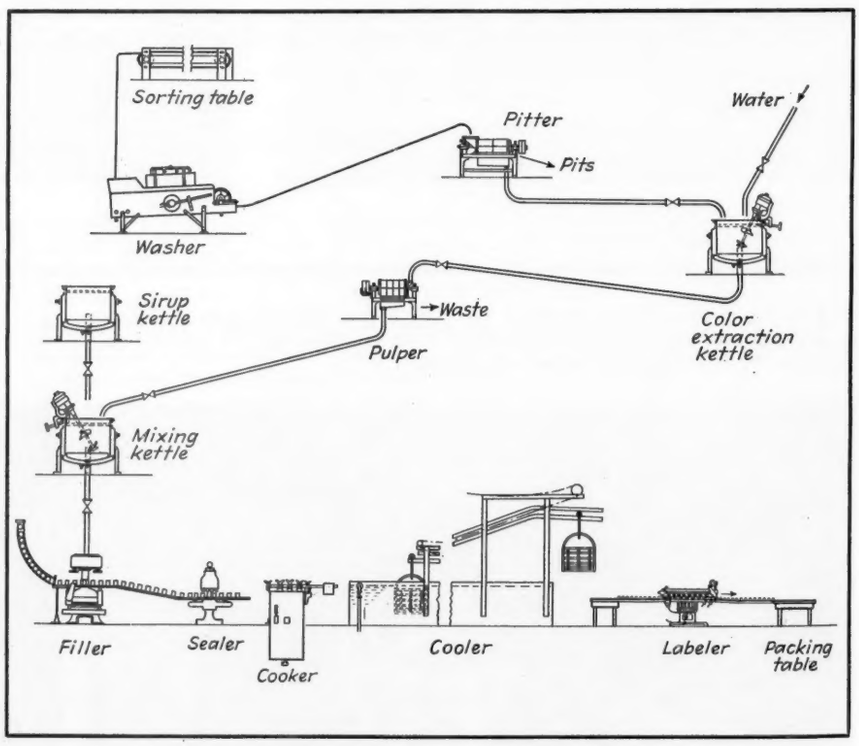
The rapid rise of the juice industry in the United States during the past nine years has been phenomenal. The total pack of all fruit juices, amounting to only 153,260 cases in 1930, had risen to the astonishing total of 23,940,814 cases in 1939. Soft fruit and berry juice in 1935 constituted 1.6 percent of the total juice pack. By 1939 this proportion increased to 2.6 percent of the total juice pack. These figures include the fruit nectars, apricot nectar constituting the largest portion of the nectars. In 1939, 197,200 cases of prune juice were packed. Most of it, if not all, was prepared by leaching dried prunes by the methods outlined by Mrak[1] and Joslyn and Marsh.[2]

During the years 1938-1940 inclusive, the Department of Horticulture at the University of Idaho has furnished fresh Italian prunes from southern Idaho which have been processed into various prune byproducts, including juice, butter, marmalade and nectar. Of these products the nectar seems the most promising, not only because it is economical to manufacture but because the existing trend in America is toward pulpy juice consumption. This latter product is a pulpy drink, brightly colored and thought by numerous persons to have a pleasing aroma and characteristic flavor.

Preparation of Prune Nectar

The essential steps in the production of prune nectar are as follows: Sorting out decayed fruit, washing, pitting, cooking to extract color from skins, pulping, mixing with sirup, filling and processing. The accompanying illustration indicates a flow diagram for the process.

Only sound fruit should be used for the manufacture of prune nectar. The addition of decayed fruit will impart a musty flavor to the finished product. Washing should be thorough and can be accomplished by spraying the fruit with water through a series of fine nozzles as it passes along on a perforated screen belt. A standard float-type apple washer could be adjusted to do a satis-



Diagrammatic flowsheet of prune nectar production, as developed at the Fruit and Vegetable Byproducts Laboratory of the U. S. Department of Agriculture at Pullman, Wash.

* Agricultural Chemical Research Division Contribution No. 58.

** Present address: Western Regional Research Laboratory, Bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, Albany, Calif.

factory job of washing. The use of an acid wash does not seem necessary with the present spraying program used on prunes.

Pitting is the most difficult part of the preparation because the pulp must be free of pits in order to prevent damage to the screen on the pulper. Since the cut prunes darken rather rapidly when exposed to air, the fruit should be handled as rapidly as possible after the pitting operation. With rapid and continuous commercial processing there should be no difficulty with darkening.

Prunes can be pulped cold as they come from the pitter, but the product lacks the rich red color produced when the prunes are cooked prior to pulping. Heating extracts a large portion of the pigments present in the skin and imparts a rich color to the finished product.

A number of experiments were carried out to determine the best cooking process. These included: (1) Cooking the pitted prunes without the addition of water; (2) cooking with added water (either the amount necessary to give the final product the proper consistency or less than the necessary amount, the viscosity later being adjusted by the addition of sirup); (3) cooking with sirup. It was found that a little more flavor was retained when sirup was used for cooking, but some sugar was lost in the skins and fibers removed by the pulper. The amount of color extracted under this procedure is satisfactory. Cooking without water gave a very thick pulp and some difficulty was encountered because of clogging of the pulper screen by the prune fibers. Since it is necessary to dilute the thick pulp to obtain the proper viscosity, the best procedure was to cook the pitted prunes with one-fourth to one-third their weight of water for 8 or 10 minutes at 160 to 170 deg. F. This procedure allows sufficient color to be extracted from the skins, reduces the viscosity of the pulp to a point where it will easily pass through the pulper, and keeps the temperature and time of heating low enough to prevent any cooked taste from developing.

The cooked prunes are then run through the pulper to give a finished texture. This pulper may be a screw-type tomato finisher fitted with a screen having openings 0.027 in. or less in diameter. If the prunes have been cooked without water, the warm pulp from the finisher will be about the consistency of waffle batter and in this condition is too viscous for use as a drink. Dilution in the correct proportions with the proper strength sirup will give a product that not only has the desired degree of sweetness but will have a suitable consistency.

After the nectar has been through the finisher it is heated to 180 deg. F. and immediately filled into cans, sealed hot and given a cook, the time depending on the size of the container used. Nine to 10 minutes in boiling water proved sufficient for a No. 1 tall can and 12 to 13 minutes for a No. 2 can. Special juice enamel cans and sanitary enamel cans proved satisfactory as containers. Plain tin cans were not satisfactory because the nectar underwent bleaching and deterioration of the flavor within three months after packing.

Care should be taken to avoid wide variations in the soluble solids content and acidity of the final product. The acidity can be controlled by varying the volume of sirup added and soluble solids by the concentration of the sirup used. As prunes mature, the soluble solids content increases and the acidity decreases. There are also variations from one growing area to another. Prune nectar with an acidity of 0.6 to 0.7 percent calculated as malic acid and a specific gravity of 17 to 18 deg. on the Brix hydrometer has been judged as having the proper balance of acidity and sweetness, and an excellent flavor characteristic of fresh prunes.

Conclusions

Fresh Italian prunes have been used in the preparation of a nectar rich in color and of pleasing taste and aroma. The product offers excellent opportunities as an outlet for culls.

References

1. E. M. Mrak, Prune Juice, *Fruit Products Journel*, Vol. 16, 230, 1937.
2. M. A. Joslyn and G. L. Marsh, Utilization of Fruit in Commercial Processing of Fruit Juices, *California Agricultural Experiment Station Circular*, No. 344, 1-63, 1937.

How To Use Waste Rind In Processed Cheese

By SIMON BRICKNER
Consulting Chemist, Brooklyn, N. Y.

Tough, thick rind of the natural Swiss cheese used as a raw material can be ground in hammer mill and used in large quantities

THE manufacture of processed American and processed Swiss cheeses offers a wide field for the utilization of byproducts in the dairy industry.

Natural Swiss cheese is covered with a quarter-inch tough rind which develops during the curing or aging of the cheese. This natural cheese is the raw material which goes into the manufacture of processed Swiss cheese and is part of the blend in American processed cheese. Before cooking, the rind must be removed from the Swiss cheese and in most cases is discarded as a waste material, entailing a loss of weight of about 15 percent of the total weight of a wheel of Swiss cheese.

Aside from the fact that the rind is a tough, brittle material, it is edible and nutritious and by analysis it contains approximately 35 percent fat and 20 percent moisture, making it ideal for processing. It cannot be ground up in the ordinary type of cheese grinder because the finished cheese will show unsightly lumps of unground rind. However, by the use of a special type of hammer mill the rind can be reduced to a fine powder which is most ideal for blending with other cheese in the kettle.

It has been found by experience that up to one-third of the batch may be replaced by rind without impairing the flavor, body, texture or slicing qualities of the finished loaf cheese. Moreover, a higher overrun is possible because of the low moisture content of the rind.

It is understood, of course, that the rind prior to grinding is thoroughly cleaned on a wire wheel brush which removes surface dirt, ink marks and so forth. Another use for the pulverized rind is a base for the manufacture of grated cheese. A blend of Swiss cheese rind and Argentine Sbrinz makes an excellent grated cheese product.

This process has been used commercially for the past one year and a half in two different cheese plants and has given gratifying results. An extension of its use would, no doubt, increase the amount of processed cheese available and also lower the cost of production.

What's Known Today About Dehydrating Vegetables

By W. V. CRUESS

Professor of Fruit Technology and Chemist in the Agricultural Experiment Station, University of California, Berkeley, Calif., and

E. M. MRAK

Assistant Professor in Fruit Products and Assistant Mycologist in the Agricultural Experiment Station University of California.

PART III* — Specific directions for preparing the various vegetables for drying are given in this third instalment of a series of articles which will constitute a "handbook" on vegetable dehydration

SINCE the details of preparation of various vegetables for drying differ considerably the directions for each are presented separately in the following paragraphs and are summarized in Table VI. In all cases use only garden-fresh vegetables if dried products of best quality are desired.

Asparagus—Only the tender tips should be used. These should be blanched in steam on screen trays for 4 to 5 minutes and dehydrated to less than 5 percent moisture at not above 150 deg. F.

Globe Artichokes—Only the tender hearts are suitable. They should be blanched in boiling 0.5 percent citric acid solution for about 6 to 8 minutes and dried as directed for asparagus.

Beans, Green String or Stringless—Most varieties become "stringy" as the pods become riper. Pods containing strings (string beans) must be prepared by hand by breaking off the ends and removing the strings. Stringless beans, on the other hand, can be prepared by machinery used in canning.

They should first be sorted to remove sun burned, spotted and otherwise defective pods. They are then thoroughly washed, snipped and broken into short lengths by hand, or cut crosswise of the pod into short lengths by machine, or sliced lengthwise by machine.

They are then spread on screen trays to a depth of two layers or at the rate of about 0.75 to 1 lb. per square foot and then blanched in live steam for 10 to 15 minutes. Nichols *et al*[22], recommend 15 to 20 minutes steaming but we find that 10 to 15 minutes is sufficient, unless the beans have become too mature. The purpose of a long steam blanching is to precook the product sufficiently that it will absorb water rapidly, and cook quickly.

They are dehydrated at 140 to 155 deg. F., that is, the finishing temperature should not exceed 155 deg. F. if the counter-current system is used. The final moisture content should not exceed 5 percent.

Broccoli—The trimmed stalks are washed, and spread one layer deep on trays. Blanching in steam for 10 to 12 minutes is recommended. The finishing temperature during dehydration should not exceed 150 deg. F. and the final moisture content should be not above 5 percent.

Beets—Only tender beets of good color and flavor and free of woodiness should be used. They should be vigorously washed in sprays in a rotary washer. They are then steamed until cooked through, with roots and the trimmed tops in place. Twenty to 30 minutes steaming is advisable; or a shorter time in a steam retort (pressure cooker) at 240 deg. F. may be used.

They are then cooled in the air until they are cool enough to handle. The tops and roots are trimmed off and the peel slipped off the flesh by hand. They are then sliced by machine in pieces about $\frac{1}{8}$ in. thick; or are cut into cubes by machine.

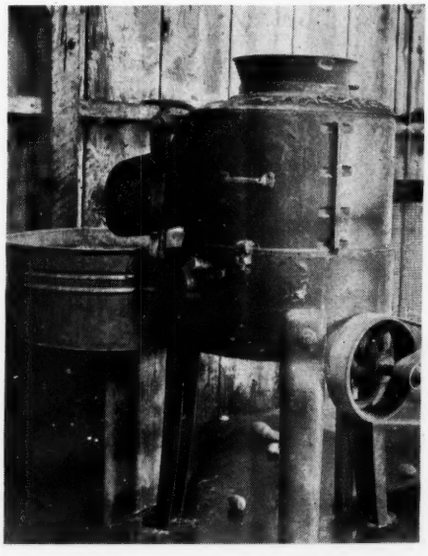
They are spread on trays, either screen or wooden, and dried. The finishing temperature should not exceed 150 deg. F. and the final moisture content should not exceed 7 percent. They can also be peeled raw in a rotary abrasion peeler, sliced, steamed 10 to 15 minutes on trays and dried.

Brussels Sprouts and Cauliflower—The sprouts and cauliflower "buttons" can be cut from the stalk or head, trimmed and sorted, cut in half lengthwise through the stem, spread one layer deep on screen trays, steam blanched 5 to 10 minutes, the time depending on the size of the pieces, and dehydrated. The finishing temperature should not exceed 150 deg. F. and the final moisture content should be below 5 percent.

The cauliflower "buttons" can also be left whole; although drying is more rapid if they are cut in half lengthwise.

Cabbage—Either the white or red cabbage may be used. The outer leaves are removed and the head is cut vertically in quarters by hand. The core segments are removed by hand and the quartered cabbage is cut into shreds about $\frac{1}{8}$ in. wide in a slaw or kraut cutter. Or the whole heads may be trimmed, cored by the special corer used in preparing cabbage for sauerkraut, and the cored, whole head sliced in a kraut slicer. The sliced cabbage is spread on screen trays, the tray load being about 1 lb. per square foot.

It is blanched in live steam for 2 to 6 minutes—sufficiently to cook it through and wilt it, but not long enough to collapse it completely. If overblanched,



Rotary abrasive-type peeler used in preparing root vegetables for drying.

* This series of articles on the dehydration of vegetables is largely a compilation of the information existing at the time the manuscript was prepared. Research will undoubtedly bring about changes, but for the present the series constitutes a complete and up-to-date "handbook" on vegetable dehydration.

valuable food values are leached out by the condensed steam, the dried product sticks to the trays, and it is very brittle.

Blanching in water or in dilute bicarbonate is inadvisable because of heavy loss of soluble food values.

It is dried at not above 150 deg. F. to not above 5 per cent moisture.

(See also *sauerkraut*; it, too, may be dried.)

Carrots—Only tender, crisp carrots free of woodiness should be used. They are washed to remove adhering soil and trimmed to remove tops and roots.

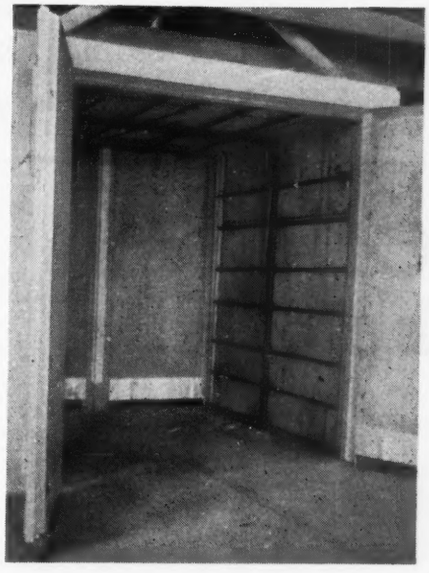
They may then be peeled in an abrasion-type rotary peeler, in sprays of water. Then they are trimmed by hand; sliced about ⅛ in. thick by machine, or cut into cubes about ¼ in. in diameter, or shredded. The tray load is about 1.5 lb. per square foot.

Or they may be peeled by immersion in dilute (about 2 percent) boiling lye (sodium hydroxide) solution, to disintegrate the skins, and then washed in a rotary washer under heavy sprays of water. They are then sliced or diced.

The trayed carrots are steamed 8 to 10 minutes; or they may be blanched in boiling water for about 5 minutes. However as with other vegetables the water blanching removes large amounts of valuable food constituents.

The finishing temperature during drying should not exceed 160 deg. F. Carrots are more resistant than most vegetables to heat damage. The final moisture content should not exceed 7 percent.

Celery—Celery is often dried to be ground to a powder for a seasoning, as in "celery salt." It is also useful in soup mixtures or for the preparation of creamed celery, etc. Only crisp, garden-fresh heads should be used. The stalks are broken from the "bunch" or head; thoroughly washed; and carefully trimmed. Spray residue if present must be completely removed.



Blanching room for treating vegetables preparatory to drying. It is equipped with perforated steam pipes and accommodates cars loaded with trays of vegetables.

If for use in preparing celery soup, powdered celery or soup mixtures, the entire stalk and the leaves are finely shredded. If the stalks are to be dried in short lengths for other purposes the leaves are removed and dried separately, as they dry very rapidly. In this case the stalks are cut in lengths of ½ to ¾ in.

The prepared vegetable is spread on screen trays at the rate of about 1.0 lb. per square foot, blanched in live steam 1 to 2 minutes, and dehydrated. The finishing temperature should not exceed 145 deg. F. and the final moisture content should be below 5 percent.

The blanching period is purposely very short in order not to lose too much of the flavor. For powdered celery the celery need not be blanched.

Celery Root—Celery root is peeled, sliced, trayed, blanched in live steam 8 to 10 minutes, and dehydrated at not above 150 deg. F. to less than 5 percent moisture.

Chayote—This is a vegetable resembling summer squash in texture and flavor. It is prepared and dried as directed for summer squash.

Corn—Any of the sweet varieties of corn used on the table are satisfactory for drying. Stowell's Evergreen is one of the best because of its high yield and excellent quality. Country Gentleman and Golden Bantam are also excellent.

For dehydration the corn is best if taken while in the milk and before the dough stage. In large plants an investment in a mechanical husker such as used in corn canneries is advisable. In small plants the husks may be removed by hand. After husking, any worm-damaged sections must be trimmed out. It is not necessary to remove the silk, since after drying, this and fine bits of kernel or cob are easily removed by winnowing, that is, by a fanning mill.

The husked and trimmed ears are then blanched in live steam or boiling water until the milk is "set"; that is, until no liquid exudes when the kernels are cut with a knife. Nichols *et al*[22] recommend 15 to 20 minutes blanching.

The kernels are cut from the cob by machine as for canning; or by hand if the amount is small.

(*Turn to page 96*)

TABLE VI—Summary of Procedures for Various Vegetables.

Vegetable	Form for drying	Blanching	Maximum finishing temperature (deg. F.)	Maximum moisture content (percent)
Asparagus	Cut to short tips. Use tender ones	Boiling water 3 minutes	145	4
Broccoli	Stalks; trimmed	Steam. 10 to 12 minutes	150	5
Beets	Sliced or diced	Cooked in steam before peeling	150	7
Brussels sprouts	Cut in half	Steam 5 to 10 minutes	150	5
Cabbage	Thin slices	Steam 2 minutes	150	4
Carrots	Peeled, sliced, diced or shredded	Steam 6 to 10 minutes	160	6
Celery	Short lengths. ¾ in.; or shredded	Steam 1 to 2 minutes	145	4
Chard	Trimmed; washed leaves	Steam 3 to 5 minutes	150	4
Corn	Cut from cob after blanching	Steam or boiling water 15 to 20 minutes on the cob	160	5
Garlic	Sliced	Steam 1 to 2 minutes; or no blanch if for powder	145	4
Horse beans	Shelled	Steam 5 to 10 minutes	145	5
Jerusalem artichokes	Sliced	Steam 4 to 5 minutes	160	5
Kale	Trimmed leaves	Steam 3 to 5 minutes	150	5
Green lima beans	Shelled	Steam 5 to 10 minutes	150	5
Onions	Peeled. Sliced thin	No blanch; or only 1 to 2 minutes in steam	140	4
Okra	Sliced	Steam 4 to 8 minutes	150	5
Mushrooms	Whole; stalks sliced (Peeled preferably)	Blanch in live steam for 5 to 8 minutes	150	5
Parsnips	Peeled, sliced, diced or shredded	Steam 6 to 10 minutes	160	7
Peas	Shelled	Steam 3 to 10 minutes	150	5
Peppers and pimientoes	Whole	No blanch	160	5
Potatoes, white	Peeled, sliced, diced or riced	Steam 5 to 10 minutes	150	5
Potatoes, sweet	Peeled, sliced, diced or riced	Usually cooked before peeling. Otherwise steam 6 to 8 minutes	160	8
Pumpkin and yellow squash for powdering	Sliced	Steam 4 to 6 minutes	160	5
Rhubarb	Lengths of ¾ to 1 in.	Steam 2 minutes	160	5
Spinach	Trimmed washed leaves	Steam 2 to 5 minutes	150	5
Summer squash and zucchini	Sliced	Steam 4 to 6 minutes	150	5
Tomatoes for stewing	Peeled. Sliced	Steam 1 to 2 minutes	150	5
Tomatoes for powdering	Cored and sliced. Not peeled	No blanch or steam 2 minutes only	150	3
Turnips and rutabagas	Peeled, sliced, diced or shredded	Steam 6 to 10 minutes	150	5

QUALITY CONTROL

Ways of Avoiding Oxidized Flavor in Drying Whole Milk • Facts About Caffeine in Foods

Preventing Off-flavors In Dried Whole Milk

By E. L. JACK and J. L. HENDERSON

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Oxidized flavor in dried whole milk can be avoided during storage periods up to two years, depending upon the method of preparation of the milk. Experiments included the use of commercially available edible antioxidants and of heat treating methods

WAR has again focused attention of those responsible for food supplies upon concentrated milk products. Dry whole milk represents the greatest degree of concentration of milk possible to attain and yet the production of this highly nutritious and easily transportable food has not approached the production of other less highly concentrated milk products, notably evaporated milk. The production of dry whole milk, according to U. S. Department of Agriculture statistics, for the 12-month period ending October 31, 1941, was approximately 36,000,000 lb., representing an increase of 10,000,000 lb. over the corresponding period of the previous year. This is less than 4 percent of the milk solids concentrated in evaporated milk in the same period—a surprisingly small amount when it is recalled that milk solids in dry milk occupy only about one-fourth the space of those in evaporated milk. As has been so aptly said: "One ship carrying dry whole milk will carry as much solids as four ships carrying evaporated milk." And yet the production and demand for evaporated milk greatly exceeds that of the more highly concentrated product.

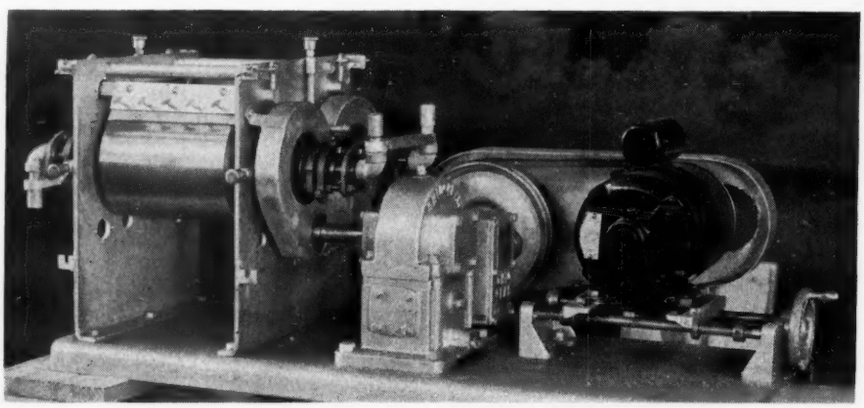
There are many reasons for the scant production of dry whole milk as compared to other concentrated products. Probably the most important is the lack of available information that would enable processors to produce dry whole milk of satisfactory keeping quality. This is important because preservation for future use is one of the principal reasons for making this product. The usual experience is that dry whole milk develops a disagreeable tallowy flavor through oxidation of the fat, within 60 to 90 days after manufacture.

Up to and during the mid-1920's, much attention was directed to experimental work studying causes and means of prevention of this defect. Supplee,[1] before the World's Dairy Congress in 1923, summarized the available knowledge at that time. Since then Holm and associates in the U.S.D.A.[2,3,4,5] and Dahle and Palmer[6,7,8] have made contributions to knowledge in this field. The general knowledge obtained from these investigations has been that dry whole milk made by the atmospheric drum process generally has better keeping quality than that made by the spray process; the onset of oxidation can be delayed materially if the product is stored at low temperatures, 32 deg. F. or below; low-moisture powder—under 4 percent—keeps better than high-moisture powder; oxidation occurs sooner if the milk is allowed to become contaminated with metals, notably copper and iron; storage in an inert atmosphere with the oxygen content below 2.5 percent improves the keeping quality; and homogenization and clarification with the removal of the bowl-slime are also thought to delay oxidation. Even with this knowledge, the net result has been a small output of dry whole milk. So the conclusion must be reached that the knowledge available is not sufficient to permit the processing of dry whole milk of consistently satisfactory keeping quality.

The present investigation was undertaken with the object of studying the value of various agents in preventing the development of this defect. The results reported here are limited in scope but the timeliness of the subject, and the fact that the investigations have been interrupted without immediate plans for resumption, have prompted the publication of the data secured with the hope that it may be of value to prospective processors of dry whole milk.

Experimental Procedure

The data to be presented were obtained, with one exception, from samples dried with a "Buflovak" experi-



Laboratory-size atmospheric double drum dryer used in the milk drying experiments, loaned for the purpose to the authors by F. L. Abbe, Oakland, Calif., agent for the makers, Buffalo Foundry & Machine Co., Buffalo, N. Y.

mental dryer (see photograph). This is an atmospheric drum dryer and operates successfully with 20 to 30 lb. of steam pressure in the rolls. Most of the samples were prepared on stainless steel rolls using stainless steel "doctor" knives, but previous trials comparing the effects of carbon-steel rolls and "doctor" knives with those of stainless steel had shown that there was no noticeable difference in the keeping qualities of the dried products. There have been ample experiences with these experimental dryers to show that the results obtained with them are accurate guides to what can be expected from commercial machines.

The milk used was of market-milk quality and was obtained from the University Farm herd in stainless steel containers, so that it did not come in contact with copper-bearing metals at any time. The samples were pasteurized at 142 deg. F., for 30 minutes, except where otherwise stated. The antioxidant materials were added before pasteurization, except the ascorbic acid. No difficulty was experienced with any of them.

The dried samples were stored in "Double-tite" friction-top tins at room temperature, which varied from 60 to 100 deg. F. The samples were examined periodically and were graded according to the judges' opinions as to whether or not they were of satisfactory commercial quality on the basis of organoleptic tests. Qualifying comments on the flavor and odor were recorded. It was found that taste and odor judgments were more sensitive in eliminating oxidized samples than were peroxide values when determined by the method of Smith[9].

Experimental Data

The accompanying table shows the length of time before the development of oxidized flavor sufficient to render the powder unsatisfactory for commercial use. Typical moisture percentages are also included.

Discussion of Results

Attention is directed to the wide differences in keeping quality of the control samples. The explanation probably lies in the steam pressures used in drying. Those with the short preservation period, 40 to 75 days, were dried with a 20-lb. steam pressure in the rolls and show a higher moisture content than the others. Those of longer keeping time were dried with a 30-lb. pressure and have a correspondingly lower moisture content. The authors lean toward the explanation that the higher heat acts directly to destroy the oxidizing agents and that the lower moisture content is largely incidental, particularly since the moisture percentage is under that found to be critical by Holm and Greenbank[2], though it must be recognized that the higher moisture content may have some catalytic activity.

Relation of Predrying Treatment to Keeping Time

Treatment	Keeping time (days) Treated sample	Keeping time (days) Control sample	Moisture percent Treated sample	Moisture percent Control sample
*"Avenol" (percent)				
0.25	180+	180	2.4	2.2
0.40	70+	75	3.5	3.5
0.5	240+	72	2.5	3.6
0.5	240+	75	3.0	3.5
0.75	210+	180	...	...
5.75	240+	75 (unnatural flavor)	...	...
*"Avenex" No. 7 (percent)				
1	180+	180	...	...
2	210+	210	...	...
2	230+	180	2.8	2.2
3	240+	180	...	...
Ascorbic acid (percent)				
0.2	210+	170	...	...
Preheat 175 deg. F. 15 minutes	over 2 years	150	2.5	1.8
Spray powder preheat 220 deg. F. 10 seconds	over 2 years	90	2.5	2.7

*"Avenol" is a concentrated extract of oat flour. Avenex No. 7 is a product designed for the ice cream industry. The authors are indebted to the Musher Foundation, New York City, for these oat-flour products.

The powders containing antioxidants show some superiority over the others in resisting oxidation, whereas with the control powders 180 days preservation could ordinarily be expected in those dried with the higher steam pressures. The antioxidant containing powders could usually be expected to keep satisfactorily for 240 days when the proper quantities had been added. "Avenol" concentrate added at the rate of 0.5 percent of the solids in the milk was the most satisfactory amount to use. Less than this in some instances failed to give adequate protection, and larger quantities showed no added advantage, even giving unnatural flavor when used in too large amounts. "Avenex" No. 7 was most useful when added at the rate of 2 to 3 percent of the total solids of the milk. There was no noticeable difference between these two materials when used in the quantities noted. The ascorbic acid was added after pasteurization and before drying at the rate recommended by Gray and Stone[10], *i.e.*, 2 grams for each 1,000 grams of milk solids. The effectiveness of ascorbic acid can be said to be approximately the same as that of the cereal anti-oxidants used.

The only treatment to give outstanding improvement in keeping quality was high-temperature pasteurization. The powder made from this treatment had excellent flavor when more than two years old. It should be noted that this also had a more markedly cooked flavor but not to such a degree as to be objectionable. Other evidence for support of high preheat treatment in preventing oxidation is the fact that a sample of spray-dried powder made from milk preheated at 220 deg. F. for 10 seconds, examined by the authors, also showed no evidences of oxidation after more than two years storage at room temperatures in sealed tins.

There are several possible explanations for the effectiveness of the higher heat treatments of the liquid milk. One is the more complete inactivation of the oxidizing enzymes at the higher temperatures. This is undoubtedly important. Probably of greater importance, however, is the formation of reducing substances in the milk by the high temperatures. Attention has been called to this particularly by the work of Gould and Sommer[11], and Josephson and Doan.[12] It has been shown that incident to cooked flavor development in milk there is a development of sulphhydryls, which are strongly antioxidant in action. There is also the probability of the oxidizing agents forming inactive complexes through the action of heat.

Summary

Dried whole milk was prepared by the atmospheric roller dryer process which maintained satisfactory flavor for over two years when the liquid milk was preheated at high temperatures, *i.e.*, upwards of 175 deg. for 15 minutes.

"Avenex" No. 7 when added at the rate of 2 to 3 percent of the milk solids, or "Avenol" when added at the rate of 0.5 percent of the milk solids, and ascorbic acid when added at the rate of 0.2 percent of the milk solids, prevented the development of oxidized flavor in dried whole milk for approximately eight months.

Control samples with no treatment except pasteurization at 142 deg. F. for 30 minutes could be expected to keep satisfactorily for two to six months, with the longer keeping time resulting from the use of higher drying temperatures.

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Facts about Caffeine, Theobromine in Foods

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Effects of caffeine on the human system have heretofore been unduly criticized, and a bad reputation has resulted for some food products containing it. This article tells you the facts about a few of the foods and beverages containing caffeine and its "cousin" theobromine. Considerable quantities are consumed without any bad effects

PREJUDICE against the use of beverages which contain caffeine is common. It has as its basis complete ignorance of certain facts, namely, the physiological action of caffeine and the occurrence or presence of caffeine in a number of common foods and beverages.

Probably the term "stimulant" has an unfortunate connotation for most people. It suggests "alcohol" or alcoholic beverages, drunkenness, hangovers, physical deterioration and other objectional phenomena attending its abuse. This is, of course, a fallacy in itself for alcohol is essentially a depressant and not a stimulant, particularly when it is consumed too often or in too large quantities.

The action of caffeine on the human system is very different from that of alcohol, as will be found by consulting pharmacological and physiological authorities. The literature is voluminous and would require many pages for a review of all the work which has been done on its physiological and psychological effects. But it has been termed "the stimulant without a hangover"—when its effect wears off the body returns to its ordinary level instead of sagging below to a state of depression.

The other cause of the prejudice is the lack of appreciation of the fact that caffeine is present in a number of other food products besides coffee. Coffee has been the "goat"—the horrible bugaboo that is held up to scorn in our schools and in our magazines and newspapers. How this idea began no one can say for certain. But it is one of the many misconceptions that "everybody knows."

Not only is caffeine considered a dangerous substance found only in coffee—in the popular mind—but there is a complete lack of knowledge regarding another closely allied substance, theobromine. This is present in considerable amounts (along with more or less caffeine) in all chocolate products. It is chemically a first cousin of caffeine and, in fact, is sometimes converted into caffeine for commercial purposes. It has a similar stimulating action, though probably to a less degree. Medically both are used as stimulants, even in cases of heart ailments.

In order to lend point to the above remarks and to provide up-to-date useful data on the presence of caffeine and theobromine in various ordinary foods, a number of analyses have been made and the results summarized in Table I.

Caffeine in Tea and Coffee

In determining caffeine in tea and coffee, the analysis was performed on brews by several common methods. The tea brew was prepared as follows:

A. 900 c.c. (almost 1 qt.) of water at a temperature of 90 deg. C. (194 deg. F.) was poured on 13.5 grams of loose tea. The temperature was kept at 90 deg. C. for 5 minutes and then the brew poured off through a strainer. The

Analysis shows that for the average rate of consumption of food and beverages, such as coffee, tea and cocoa, the caffeine and theobromine content are not enough to cause any bad effects on consumers.

tea and water used are in proportion of 1 oz. of tea to 2 qt. of water.

B. 900 c.c. of water at 90 deg. C. was poured over six tea bags. The contents of a bag had previously been found to average 2.28 grams, and hence the six bags used contained 13.68 grams of tea. The brewing was held at 90 deg. C. for 5 minutes and the bags then removed.

Coffee brew for the caffeine determinations was prepared in the following manner:

A. Drip method—950 c.c. of boiling water was poured into the upper compartment of a stainless steel drip pot containing 48 grams of coffee. This proportion is two level tablespoonfuls per ½ pt. of water. This is a commonly accepted, average recipe A fairly fine or "drip" grind of coffee was used.

B. Percolator method—The same proportion of coffee (in a regular or percolator grind) and water were used as in (A). The brewing was continued for 10 minutes after the water being pumped up showed a barely perceptible tinge of color.

C. Vacuum coffee maker method—The same proportions of coffee (ground very fine—pulverized but not floury) and water used as in (A). This was placed in a glass vacuum-type coffee maker on an electric heater. As soon as all the water possible has been driven into the upper bowl, the coffee-water mixture was stirred and the heat turned off, allowing the brew to filter into the lower bowl.

In addition to the above types of food products caffeine determinations were made in duplicate on two well known carbonated beverages of the "cola" type. In determining the caffeine in the tea and coffee brews and in the carbonated beverages, the Power-Chestnut Method[1] was used, with the exception that a measured portion of the beverage was taken instead of the alcoholic extract from 10 grams of coffee. To this was added the 10 grams of magnesium oxide, the mixture evaporated and the determinations made according to the Power-Chestnut Method.

Caffeine and Theobromine in Chocolate Products

Both caffeine and theobromine were determined on well-known brands of breakfast cocoa, baking chocolate and sweet milk chocolate (sold in the form of flat bars as a confection).

Cocoa—Directions on the package suggested the use of 1 heaping teaspoonful (average 4.5 grams) per 8 oz. of milk and water. This should make one and a half servings of the beverage, and hence the caffeine and theobromine content were calculated accordingly. The method of analysis was that of Decker-Kunze,[2] with the exception that instead of filtering the water extracts obtained by boiling the sample with magnesium oxide and water, they were centrifuged and the decanted liquid poured through filter paper. This was found to be far more rapid than suction filtration.

Baking Chocolate—Directions on the wrapper of baking chocolate suggested the use of 2 oz. (56.7 grams) to 1 qt. of milk and water. This would make six servings and the results were calculated accordingly. The same method (Decker-Kunze) was used.

Sweet Milk Chocolate—This product is, of course, eaten "as is." A 10-cent bar was found to weigh 98.5 grams (weight stated 3½ oz. or 99.7 grams). On attempting to use the Decker-Kunze method, certain fundamental difficulties arose that made changes absolutely necessary.

The first was a physical difficulty. In the Decker-Kunze method, the hot water extract obtained as mentioned above is supposed to be evaporated to dryness on sand. This mass is put into an extraction thimble and extracted for eight hours or more with hot chloroform in a continuous fat extractor. This is entirely satisfactory in the case of cocoa or chocolate, but when considerable sugar is present, as is the case with sweetened chocolates, the sugar extracted by the hot water is a sticky mass when dried on the sand. This is almost impossible to dry thoroughly and almost impervious to the choloroform. Three attempts were made to perform the determinations by this process, using various proportions of sand and methods of drying. After several days of extracting only a fraction of the caffeine and theobromine was removed.

The second difficulty was a minor one. In the Decker-Kunze method, the dry mixture of caffeine and theobromine is treated with benzene to dissolve out the caffeine, theobromine being practically insoluble in this solvent. The theobromine is then determined by Kunze's method with excess silver nitrate, filtration and subsequent titration. This is satisfactory apparently in the case of pure cocoa and chocolate which contain little, if any, reducing sugars. In the case of sweetened chocolate, however, the chloroform extraction process or any other solvent extraction, as was determined by several experiments on water extracts of sweet chocolate, is also very apt to remove some sugar. This readily reacts with ammonial silver nitrate during the boiling of the theobromine residue. The answer to this difficulty was, of course, to determine nitrogen in the residue by Kjeldahl digestion and to calculate from it the amount of theobromine. It might be said here that all figures given in the table for caffeine and theobromine are based on nitrogen determinations and not direct weighings.

Theobromine is somewhat remarkable for its comparative insolubility in organic solvents. A number of approximate determinations of its solubility in various solvents at room temperature is shown in Table II.

TABLE I—Amounts of Caffeine and Theobromine in Various Foods.

	Caffeine (mg.)	Theobromine (mg.)
Tea (per 5-fl. oz. cup)		
Brand *A*, loose	75.6	.....
Brand *A*, tea bags	62.9	.....
Brand *B*, loose	65.4	.....
Brand *C*, loose	60.2	.....
Coffee (per 5-fl. oz. cup)		
Brand *A*, drip method	67.8	.....
Brand *A*, percolator method	100.9	.....
Brand *A*, vacuum maker method	88.9	.....
Brand *B*, drip method	76.9	.....
Brand *C*, drip method	97.3	.....
"Cola" type beverage (per bottle)		
Brand *A*, 6 oz	37.2	.....
Brand *A*, 6 oz	38.3	.....
Brand *B*, 12 oz	112.4	.....
Brand *B*, 12 oz	100.8	.....
Cacao products		
Breakfast cocoa (5-oz. cup)	1.1	55.1
Baking chocolate (5-oz. cup)	7.8	125.7
Sweet milk chocolate (10 cent bar)		
Chloroform extraction	58.1	301.4
Tetrachloroethane extraction	78.0	439.0

TABLE II—Approximate Solubility of Theobromine.

Solvents	Mg. per 100 c.c.
Benzene	5.0
Carbon tetrachloride	5.0
Ethyl acetate	11.0
Petroleum ether	10.0
Ethyl ether	25.0
Trichloroethylene	193.0
Ethylene dichloride	0
Dichloroethylene	88.0
Ethylidene chloride	40.0
n-Butyl chloride	14.0
Methyl chloroform	0
Iso-propyl ether	12.0
Iso-propyl acetate	10.0
Iso-propyl chloride	9.0
Carbon bisulfide	2.0

Extraction Methods

Other investigators[3] have used a phenol-chloroform mixture for theobromine extractions, but it is stated elsewhere[4] that phenol-chloroform may extract other substances also. Harral[5] has found it easier to convert theobromine to caffeine and then extract. This is of course out of the question when the separate figures are desired. Wadsworth[4] and others[6,7] have used tetrachloroethane as an extractant.

It seemed worth while to try using

(*Turn to page 95*)

Food Processors Face Sweetener Shortage

By R. S. McBRIDE and GORDON W. McBRIDE
Consulting Editors, *"Food Industries"*, Washington, D. C.

This is unpleasant reading. But it might be much worse. Shortage of sugar and other sweeteners, caused by smaller supply and tremendously increased demand, must be met by the food industry. Curtailed allocations for industry necessitate shifts in formulas and in merchandising

SUPPLY of sugar for the United States is now less than normal because we can not bring in any Philippine sugar, and we may not be able to get all of the normal Hawaiian supply. This cuts the available sugar about a million tons. Some of this cut may be offset by increase in production of cane and beet sugar within the United States. Larger increases in supply from Puerto Rico and Cuba seem certain. But altogether these will not quite offset the cut in supply from Pacific sources.

Tremendous increase in sugar demand is certain. A small part of this comes from the increased use desired by American food industries and American households. That increase comes from "better business" and from greater individual incomes. Both of these factors tend to increase both use and wastage of sugar and sugar-containing foods.

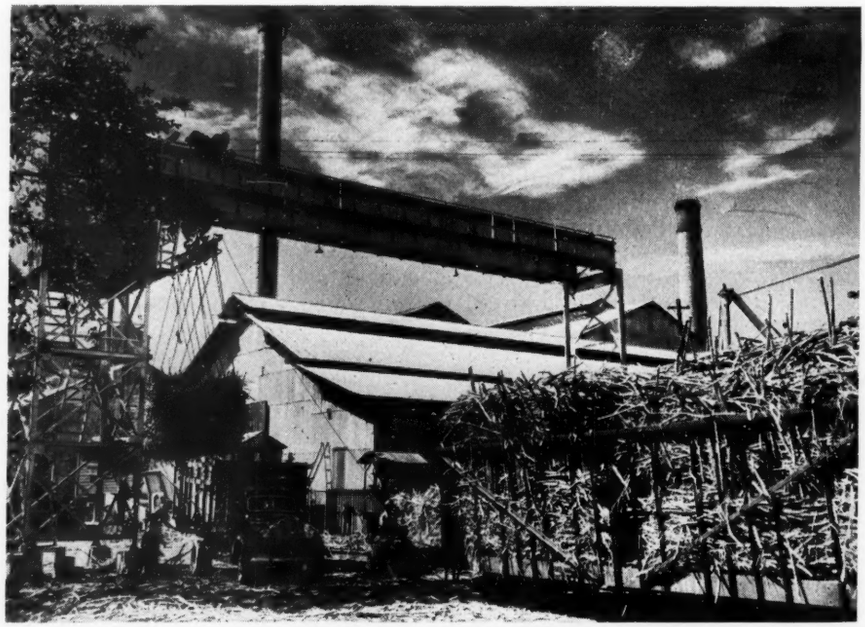
The increase in demand at home, although large, is far less than the increase in demand for export to Britain, Russia, and other Lease-Lend customers. About fifty million people pull their chairs up to Uncle Sam's table daily who formerly were fed elsewhere. Caring for their sugar needs is really the principal cause of our sweetener shortage. No one can say whether their demand must be met with a million tons or two million tons per year. But it is a lot! And it accounts for the major difficulty which U. S. food manufacturers are going to experience this year and next.

The accompanying tables and map show the normal production of sugar throughout the world in the crop year 1939. They also indicate the consumption in the major consuming areas. (See Table I.) The government is undertaking to make a comparable forecast table for 1942. Those forecasts show the facts indicated above, as nearly as anyone can identify them for the readers of FOOD INDUSTRIES at the present time.

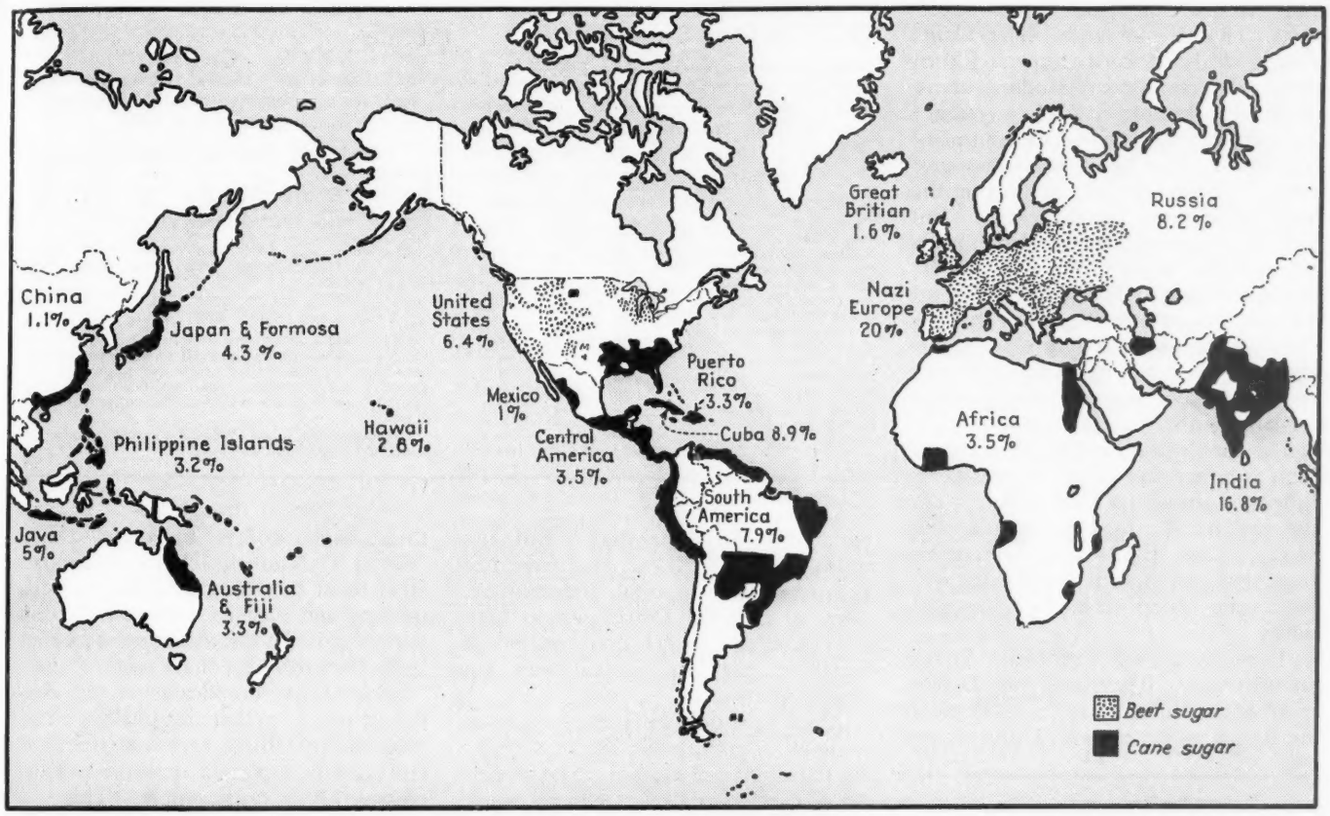
Approximately two-thirds of the sugar used in the United States goes to household or institutional users. Not all of this appears on the table in the sugar bowl. Much is used in cooking. But none of that two-thirds is a part of the manufactured-food raw material. That which concerns us at the moment is only one-third of the United States sugar consumption, or the part which is used in food manufacture. The accompanying tables, also based on 1939 operations, show which industries of our group are the most important. They show also which depend most on cane sugar, which on beet sugar, and which use corn sweeteners extensively. (See Tables II and III.)

Still further details as to the source of sweeteners are found in Table IV, which shows the quantity of minor sweeteners employed and the relationship of these both to total use and to consumption per capita.

Rationing of sugar for households is a very big task, but the principles involved are few, and simply solved. Ration books will be issued to the housewife permitting her to get her quota from time to time, the quantity depending on size of her family. Rationing for the wholesale and retail trade will be based on the quantity of business previously done, with appropriate ad-



Sugar cane being delivered by crane to a Puerto Rican sugar mill. Accelerated output of the industry in Puerto Rico, Cuba and continental United States will help offset the curtailment of sugar shipments from Pacific sources.



World production of sugar prior to the war (percentages are based on world total for both beet and cane). Shaded areas indicate chief sugar-producing countries (black areas are for cane sugar, dotted for beet sugar). Occupied areas of Russia are not included in the figure for Nazi Europe. Most U. S. imports have come from Cuba, the Philippines, Hawaii and Puerto Rico, in order named.

justments where large population shifts have occurred because of war industry. Institutional purchases will be provided for, on a basis as nearly as possible in harmony with need, according to the number of persons or meals served.

Allocations for Industries

Allocation of sugar for food manufacture will depend on two factors. Quantity given to any industry group will depend on the importance of that group in serving public diet needs. The quantity given to individual companies in each group will depend mainly on the amount of business done in the previous year, 1941. As this article is prepared, there are no details worked out for these allocations. But it is clear that each industry group will soon learn what its quota will be as compared with previous purchases.

Initially the government is proceeding on the assumption that it must cut the total use of sugar by about one-third from that of last year. Something less than a pound per person per week will be available for home use. The supply for industry will probably vary from 50 to 60 percent of 1941, for less urgent uses, to not more than 80 percent of the typical usage of last year for the needs which are most important.

At the outset, there is not as wide a difference in the allocations between groups for 1942 as there will be later. It is quite certain, however, that some food-manufacturer groups will get a substantially smaller percentage quota than other groups. Official Washington does not talk too much about that yet. But the pressure is sure to be applied before long.

There has been a great deal of loose talk about substitute sweeteners. As a matter of fact, every consideration which limits the supply of refined cane sugar and beet sugar applies about equally to invert sugar, refiners sirup, molasses and minor cane and beet products. To talk about substitution of these for sugar is futile.

There is an abundance of corn. Some folks have thought, therefore, that there

TABLE I—Source and Use of Sugar.

Data from U. S. Department of Agriculture, production in crop year 1939 and consumption in year beginning September 1, 1939, in thousands of short tons of raw sugar, or raw sugar equivalent.

Country	Beet sugar	Cane sugar	Total production	Total consumption
United States	1,758	504	2,262	6,892
Hawaii	.....	977	977	31
Puerto Rico	.....	1,019	1,019	77
Cuba	.....	3,157	3,157	173
Brazil	.....	1,296	1,296	1160
Other Western Hemisphere	100	2,836	2,936	2,062
Great Britain	591	.....	591	2,170
France	1,102	.....	1,102	1,159
Germany	2,845	.....	2,845	2,798
Russia	2,923	.....	2,923	2,762
Other Europe	3,101	.....	3,101	3,653
Union of South Africa	.....	596	596	291
Other Africa	.....	607	607	751
Philippine Islands	.....	1,142	1,142	109
Australia and Fiji	2	1,173	1,175	532
Java	.....	1,769	1,769	362
India	.....	5,977	5,977	4,878
China	.....	408	408	751
Japan and Formosa	34	1,500	1,534	1,399
Other Asia	39	83	122	746
World totals	12,495	23,044	35,539	32,756

TABLE II—Consumption of Sugar in United States.

Data from U. S. Department of Commerce for calendar year 1939, in thousands of short tons of refined sugar.

Industry groups	Quantity	Percent of total
Household and restaurant	4,128	64.7
Industrial (total)	2,272	35.3
Bread and bakery products	574	8.9
Confectionery and related products	541	8.4
Canning and preserving	300	4.7
Flavoring extracts and sirups	230	3.6
Beverages:		
Nonalcoholic	234	3.7
Alcoholic	15	.2
Dairy products	182	2.8
Meat packing	26	.4
Grain mill products	26	.4
Tobacco	21	.3
Foods, n. e. s.	123	1.9
Total	6,400	100.0

must be equal abundance of corn sweeteners. That is not true. The plants making dextrose, corn sirup, and corn sirup solids are already working above normal rated capacity. They can not make any more sweeteners without plant expansion. The government may give some of them a priority permitting the building of more plant capacity. But such relief can not be very large, probably will be negligible as a factor for this whole year. It is a waste of effort for most food manufacturers to talk about changing their formulas for use of a corn sweetener instead of a cane or beet sugar. The material simply is not available.

The supply of other minor sweeteners such as honey and maple sugar is being fully used already for food making. The use can not be increased significantly soon. Thus the food manufacturer must make some plans to get along with less sugar. There seems to be no alternative.

These facts were generally known months ago. Therefore, the Department of Agriculture has gradually raised sugar crop quotas both for United States agriculture and importers. But not until January 15, 1942, was unlimited production and importation authorized. Now, at last, the Department is making an effort to get every pound of sweetener that can be had from any source whatsoever.

Much misinformation has been made available regarding the use of molasses for the making of alcohol. Manufacturers of that essential war material would like to use up to one million tons of sugar per year (mostly as molasses) for nonfood purposes. They realize, however, that they can not do so. But the public must realize that some alcohol is so urgently needed that a substantial quantity of raw sugar or molasses must be allocated to that war effort.

The alcohol demands of American industry in war time are several times as great as during peace. Much alcohol is used in making smokeless powder. Many other wartime activities add to the demand. Lately, however, a new demand has developed. It is the great need of alcohol for manufacture of the rubber-making chemical, butadiene. That essential for the manufacture of synthetic rubber can probably be made most cheaply and quickly from alcohol.

For some years we have talked "butter or guns." Generally we have come to believe that we need the guns so badly that we willingly give up other things which we have figuratively called "butter." Now the choice is similar. If we want tires for essential uses, both military and civilian, we must give up some sugar. Without sugar we cannot make the rubber for these tires.

Thus many complicated factors contribute problems that are appalling. The food manufacturers are caught in a cross fire of increased demand and decreased raw-material supply. This is a serious matter. Nothing can prevent it from becoming more serious. Nothing but the end of war can stop the troubles which ensue. To do without usual amounts of sugar for much of our food manufacture is therefore a necessity. And a whole series of new problems have to be worked out as best we can by the best food technology available for each individual plant.

TABLE III—Sweeteners for Food Manufacture.

Data from Census of Manufacturers for 1939, in millions of pounds, showing reported consumption of major sweeteners by principal groups of users in food manufacture, but not including consumption by very small firms such as the corner bakery or in the household. Where blanks appear the use reported was less than 500,000 lb.

	Cane sugar	Beet sugar	Corn sirup	Corn sugar
Biscuit, crackers, and pretzels	122	107	24	12
Bread and other bakery products	621	276	26	119
Candy and other confectionery	480	256	502	22
Canned and dried fruits and vegetables	221	114	....	17
Cereal preparations, including prepared feeds for animals and blended flours	27	23	....	2
Cheese	1	1	....	....
Chewing gum	61	1	16	1
Chocolate and cocoa products	224	33	8	2
Condensed and evaporated milk	63	43	....	3
Creamery butter	14	17	....	1
Flavoring extracts and sirups not elsewhere classified	424	8	13	15
Food preparations not elsewhere classified	210	22	....	8
Ice cream and ices	130	53	....	10
Liquors, rectified or blended	3	....	....	....
Macaroni, spaghetti, vermicelli, and noodles	1	....	....	....
Malt liquors	8	1	49	72
Meat packing and custom slaughtering	31	12	....	3
Nonalcoholic beverages	438	22	3	6
Pickled fruits and vegetables, vegetable sauces and seasonings	55	31	....	4
Preserves, jams, jellies and fruit butters	74	43	....	5
Quick frozen foods	7	1	....	....
Salad dressings	41	12	....	....
Sausages, and miscellaneous meat products not made in meat packing establishments	5	....	....	1
Special dairy products	5	....	....	....
Wines	11	1	....	6
Vinegar and cider	1	....	....	....

TABLE IV—Consumption of Food Sweeteners.

Estimates by authors for 1939, calculated as dry sugar equivalents from official and trade data, showing relative importance of sweetener sources. Population base 130,000,000.

	Total Use (million lb.)	Per capita (lb. per person)	Percent of total
Cane sugar	9,465	72.8	63.5
Beet sugar	3,480	26.8	23.4
Refiners' sirup	30	0.2	0.2
Invert sugar sirup	89	0.7	0.6
Liquid sugar and other sugar sirups	136	1.0	0.9
Sugar cane sirup	180	1.4	1.2
Edible molasses	123	0.9	0.8
Corn sugar	220	1.7	1.5
Corn sirup	915	7.0	6.2
Sorgo sirup	83	0.6	0.6
Maple sugar	10	0.1	0.1
Maple sirup	19	0.1	0.1
Honey	129	1.0	0.9
	14,879	114.3	100.0

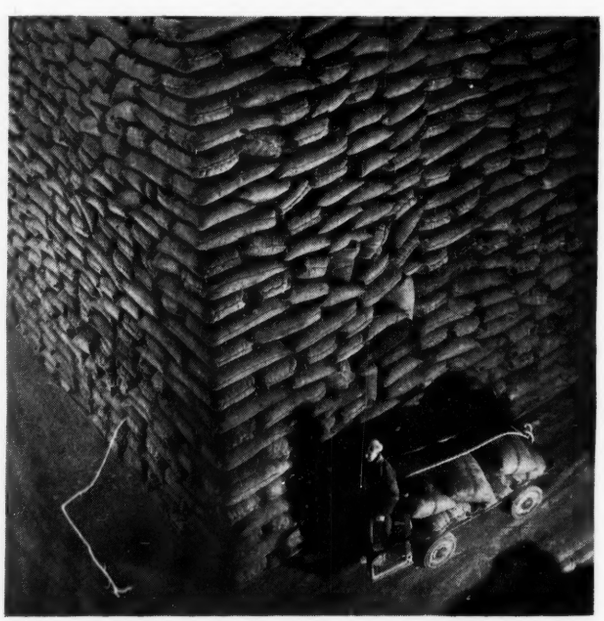
TABLE V—Sugar Quotas.

Department of Agriculture initial quotas set to regulate crops and imports of sugar (in thousands of short tons of raw sugar equivalent) for representative years since inauguration of the plan in 1934.

Area	1934	1937	1939	1941	1942*
Domestic beet	1556	1614	1585	1550	1863
Mainland cane	261	271	430	420	505
Hawaii	917	977	959	938	1127
Puerto Rico	803	832	816	798	959
Virgin Islands	5	5	9	9	11
Philippine Is	1015	1036	1053	1007	1238†
Cuba	1902	1922	1954	1869	2298
Other Foreign	17	27	27	26	32
Total	6476	6683	6832	6617	8032

* The 1942 quotas were announced on December 31, 1941. Two weeks later all acreage restrictions were removed from continental sugar crops, and purchases of entire foreign crops have been announced. Effort is now to secure maximum deliveries from each source.

† Probably no more Philippine sugar can be expected for some time to come.



Once something that we had too much of, sugar has suddenly become a commodity which can not be obtained in the desired quantities either by food processors or by consumers.

Shorts on Shortages

Order Controllers Early

WHEN you are ordering automatic control instruments you should allow from eight to twelve weeks for delivery. Many instrument makers report they are experiencing delays in getting deliveries on the valves. Making up the instruments is rapid once the valves are on hand.

Outmoded Labels Allowed

IN VIEW of the impending scarcity of paper, a way has been devised to permit utilization of obsolete labels that otherwise would become waste paper. Many good labels have been outmoded because of recent changes in Federal food laws or regulations under which some technicality precludes their further commercial use. If such labels are submitted to the proper authority in the food division of WPB, presumably E. A. Mayer, a firm ruling may be obtained as to permissibility to use them exclusively on Lease-Lend goods or Army contracts, according to unofficial information.

Vitamin Situation

VITAMIN C is said to be going to India in huge quantities for therapeutic purposes. It's a complex story wholly out of place in these pages.

Vitamin A, in the form of fish liver oils, has received some unexpected market jolts at the hands of OPA which are not beneficial to the industry nor to the national war effort. First came the price ceiling for vegetable, fish and animal oils, that accidentally included fish liver oils irrespective of vitamin A potency. Then ensued a period when nobody in OPA seemed to want the responsibility of establishing a price ceiling on the fish liver oils, but nobody would exempt this commodity from the prior order.

On February 10 the health supplies branch of WPB took over, with the apparent idea of preventing unnecessary use of vitamin A oils, and prohibits preparation of doses larger than 5,000 units on the debatable theory that the human body cannot absorb more than this quantity per day. Also other restrictions on its use and dosage were promulgated.

Fears engendered by this form of approach to an admittedly difficult matter have resulted in squelching incentives to explore and seek new sources of fish livers to replace Norwegian, Japanese and others now cut off by war.

Market wise, the situation is peculiar, holding the appearance of ample supply, whereas in truth the opposite is probably truer.

Alcohol Problem

USE of ethyl alcohol as a base for production of butadiene for further manufacture of synthetic rubber will be a surprise to many persons. Official announcements on it are anticipated in the near future.

Alcohol is likely to be in such great demand that every resource for its industrial production will be called into action. Whiskey distilleries are already at work producing industrial alcohol. It would not be surpising if breweries may be forced into a similar role provided the necessary distilling equipment can be made available.

An eminent chemical engineer of considerable experience in alcohol manufacture has stated that in an emergency a rectifying still can be built of wood and packed with ceramic plates, which will produce alcohol of better than 80 percent absolute.

German Tin Supply

APPARENT consumption of tin in Germany amounted to 10,000 long tons in 1940 compared with 13,000 tons in 1939, according to recent British information via the U. S. Bureau of Mines. In the same year the apparent consumption in the United States was 76,000 tons and in the United Kingdom it was 32,000 tons. Furthermore when Germany overran the Netherlands and France it acquired 5,600 additional long tons.

Germany's tin consumption has been declining for some years, suggesting that the Nazis are increasingly independent of this material.

Container Shifts

CALIFORNIA Packing Corp. and Corn Products Refining Co. have gone in for glass containers in considerable volume to replace tin containers now on the restricted list. Both concerns foresaw the problems arising in the Far East and began to prepare for trouble a year and a half ago. Here is a case where foresight has paid big dividends.

It requires about a year from the idea for a package change to the actual operation at full speed. In the case of packaging "Karo" corn sirup in glass there were many unusual problems to be solved.

Metal Preference

DESIGNERS of machinery and equipment, and other users of metals, have a better chance to get needed raw material for fabrication if they will specify metals that are less scarce. Where there is an option in design, WPB asks that the metal farthest down the following list be chosen in preference to any item earlier. The list is arranged in the order of increasing availability of the metals, as follows: Magnesium, aluminum, nickel, copper, zinc, lead, iron and steel.

Cork Inserts Problems

SUBSTITUTES or "alternates" for cork liners for crown closures of carbonated beverages are the subject of active research in a variety of organizations for the reason that all cork is imported. Importations may or may not continue. A two-year supply is said to be on hand.

Efforts up to date have not proved very encouraging.

Pressure goods have bottle pressures averaging about 60 lb. per square inch. Where properly applied, composition cork liners will not leak, or vent, gas until pressures in excess of 100 lb. per square inch are attained.

Attempts to duplicate in size and action the cork inserts or disks by using pulp or similar mass with various binders have resulted in a number of leakers too large for good practice, running up to several percent in some cases. Regular cork disks usually run less than one leaker per 1,000.

Lack of the resiliency possessed by cork has proved a discouraging factor in most alternate materials. New Zealand experimenters have found that what appears satisfactory for a few days gradually undergoes a permanent compression or deformation with the result that all closures become loose.

In the United States the bark of the paper birch tree is being investigated as a cork substitute by the Division of Forestry, University of Minnesota. While this bark does not have a corky structure, it does possess some properties that warrant further investigation.

The field is still apparently wide open for a satisfactory cork substitute.

Labor Disputes Settled While You Wait

By G. L. BLUMENSCHINE
President, Best Foods, Inc., New York, N. Y.

Forty-five hundred experts on the panel of American Arbitration Association are quickly and silently settling hundreds of arguments between labor and management. It is a nonprofit, nonpartisan activity. And industry should use such facilities as it offers before dumping their labor troubles at the door of an already overworked Federal government

THE success of the food trade groups in maintaining efficient output in face of a change from domestic to war emergency production schedules will depend in a large measure upon how effectively the industry can avoid becoming disrupted by commercial and labor disputes.

From the strictly commercial angle —that is, controversies between business men—the food industries are well insulated against long-drawn-out disputes, through an effective arbitration system established back in 1913 to cushion the impact of post-war contract disagreements.

Largely through the efforts of William Silver, a food broker of Aberdeen, Md., and Walter B. Timms, then treasurer of the National Wholesale Grocers Association, an inter-trade system for settling controversies out of court was established, with arbitration boards in 71 principal cities. This trade peace setup, formally called the "National Uniform Plan of Arbitration," was organized principally for members of the National Wholesale Grocers Association, the National Food Brokers Association and the National Canners Association. Various other associations related to food distribution have since adopted similar measures, most of them using the rules and procedure of the National Uniform Plan of Arbitration. The 71 boards are made up of food experts and sit as a panel of one or three on cases submitted to them.

As a result, the food industries have little to worry about from disagreements which arise out of contract relationships, for there exists ample dispute-settlement machinery. But commercial disagreements are only one phase of the strife problem facing business today. The other major sector is the labor dispute which carries with it the problems of lost hours, wages, profits and production and which blazes in its wake a path of ill will and disunity.

In this respect, a majority of food industries are vulnerable to strikes and lockouts, for there exists no widespread arbitration machinery within the framework of the various associations to deal with labor problems. To be sure, individual firms have overcome labor differences by peaceful means, but the contrast is great between the blanket protection afforded the food industries by their excellent arbitration system for commercial disputes, and the lack of uniformity for maintaining labor peace.

This does not mean that the food groups have to go ahead in hit-or-miss fashion in dealing with labor troubles. Nor does it imply that they could remedy the matter by setting up an all-industry labor arbitration plan, for there are too many unions and too many branches for such a project to be practicable.

One thing that can be done is to adopt the ways of the companies and unions using the facilities of the American Arbitration Association.

In 1938, while the country was going through a series of organizational strikes, the association, an old-timer in the field of commercial controversy, organized a labor tribunal, for the specific task of settling the disputes which arise between management and labor.

How It Functions

The association is a national, nonprofit, nonpartisan organization which has over 400 trade groups submitting their controversies to it for quick and efficient adjudication. Industrial arbitration is no anemic, sporadic peace movement used solely by the weak unions and the timid employers, fearful of testing their respective strength by stopping the work of men and machines. No minor industry, for example, is aviation, in which eight of the largest plane producing companies have provided for arbitration in their contracts with labor.

The backbone of the American Arbitration's labor set-up is a panel of 4,500 experts who serve as arbitrators in industrial disputes. These men, for the most part, come from the professions which are not actively affiliated with either capital or labor, and yet command the respect and confidence of both. Typical of the men on the Association's labor panel are Elmer Andrews, former Wage and Hour Administrator; Wesley A. Sturges, professor of law at Yale University, and Nathan Isaacs of Harvard, one of the country's leading authorities on business administration. Edward F. McGrady, trouble shooter extraordinary, thought so much of the AAA's labor work, that he consented to become a director of the organization.

You have heard little of the 2,847 silent settlements these arbitrators have effected in 1941, because the hearings are conducted in the quiet and privacy of conference rooms. There's nothing dramatic that merits headlines in a scene where a group of men are sitting around a table overcoming their controversies while the workers stay on their jobs.

Consider, for example, the following contrast as an illustration of how arbitration keeps our industrial wheels turning.

Last spring, a wholesale meat estab-

lishment plant promoted one of its men to the job of foreman. When the time came for him to pay his dues, he balked, claiming that his new position made him a semi-executive, and therefore, he was not obligated to belong to the union. The management stood by the foreman; the union threatened to strike, and did so. A thousand men were out. After three weeks, the foreman gave in, paid his dues and work was resumed. Trivial? Perhaps—but many strikes have had no more vital issue at stake.

A similar issue arose in a trucking firm whose principal business is rural-urban delivery of food. Both sides were working up to a strike when one or the other suggested a better way. Two days later, the general manager of the company and a business agent and the employee in question met in the New York tribunal of the AAA at Rockefeller Plaza. The arbitrator was a professor of industrial management, well versed in labor-management problems. He spent one day taking testimony and rendered his decisions the next. Total costs? Fifteen dollars apiece as the Association's fee to cover clerical expense.

Here is another illustration of how this industrial peace-making organization is carving a niche in the nation's efforts toward internal unity. An employee in a meat packing plant was discharged for staring a fight during working hours. He countered with the charge that he was fired for union activities. The case came to arbitration instead of the picket line.

The room where the hearing was held is well appointed with pictures and paintings on the wall. Soft chairs flank the long table down the room. Ash trays and water decanters add an air of informality. It's difficult to work up ire in such surroundings, a visitor once said. That is just the idea.

"Hello, Mr. Jones," the business manager sang out as the "boss" walked in, "You look fit as a fiddle."

"I have to be, to keep up with you fellows," the employer replied with a smile.

The arbitrator, a lawyer with clients on both sides of the capital-labor fence, opened the hearing as both sides signed an agreement to abide by the award. The first witness was the discharged man himself, who finally admitted participation in the fighting.

"But he 'egged' me on," he exclaimed, pointing to another employee at the end of the table. "He said I was a stooge of the union."

The arbitrator, a former employee in a food factory himself, turned to the employer.

"Is this the first time that this man has ever been in trouble?"

"Yes," answered the boss, "the first time."

Then followed three more witnesses. The next day, the arbitrator reached his decision—the worker was to be reinstated, but with the proviso that, should he ever again be involved in a brawl on company time, he was to be discharged without pay.

Providing for Arbitration

Primarily, there are two ways by which members of the food industry can have their claims arbitrated by American Arbitration Association.

The first, and perhaps the most effective, is by including the standard arbitration clause in all contracts between unions and management. The clause is simple and reads:

"Any controversy or claims arising out of or relating to this contract or the breach thereof, shall be settled by arbitration, in accordance with the Rules, then obtaining, of the American Arbitration Association, and judgment upon the award rendered may be entered in the highest court of the forum, state or federal, having jurisdiction."

According to the Department of Labor, 60 percent of the contracts filed in Washington have clauses for mediation or arbitration contained in the agreements as a means of insuring the prompt and efficient settlement of all future disputes as soon as they arise.

The second method is usually effective, but is used *after* a dispute has arisen. In such an instance, the parties sign a submission agreement referring the controversy to arbitration and agreeing to abide by the award of the arbitrator.

It is significant to note here that in all cases of arbitration under the rules of the AAA, no one has ever refused to abide by the award.

For those who would like a list of representative questions which have been settled by the AAA's labor tribunals, the following are typical:

Shall wages be adjusted when machine production replaces hand work?

Was a 10 percent decrease justified by the employer's recent financial losses?

May an employer compel overtime work and thereby deprive laid off employees of reinstatement?

Is the principal of seniority applicable when no mention of it is made in a contract?

Was a certain employee fired for inefficiency or union activity?

These are but a few of the problems the experts of AAA have been called upon to answer. The Association, however, does not confine itself solely to individual arbitration, although that is its main task. It is now engaged in a nation-wide campaign to enlist all industries on behalf of the national war program and help make this country free from dispute. It believes that only a nation which is united, industrially and commercially, from within, can withstand the pressure and subversive activities from those forces acting against America within its borders.

A case comes to arbitration instead of the picket line. In the hearing rooms of American Arbitration Association, a typical industrial arbitration proceeding takes place between management and labor. Soft chairs flank the table. Ash trays and water decanters add an air of informality. It's difficult to work up ire in such surroundings.

Prepare Now For Labor Shortages

By G. L. MONTGOMERY
Associate Editor, *"Food Industries"*

Demands of the Selective Service Act, coupled with high wages paid by the munitions industries, seriously threaten supplies of labor for food processing plants, unless steps are taken immediately

REVIELLE sounded for American industry on December 7, when "Japanazi" bombs shattered the Sunday peace of Pearl Harbor. Since that day, changes resulting from full mobilization have followed upon each other with bewildering rapidity. Doubling of the size of the Army, plans for tremendous increases in the production of war materials, astronomical budget figures and spectacular jumps in prospective crop acreages have tended to obscure some of the less dramatic but most necessary steps that must be taken.

One thing of outstanding importance, if food processors are to meet the demands of the Army and Navy, the civilian population and of Lease-Lend shipments of food to the United Nations, is that steps be taken to assure sufficient labor to operate food processing plants at capacity.

Why, you may ask, is this going to be necessary? Do we not still have available a reservoir of unemployed? And did we not have a more or less ample labor supply to man the food industries in 1941? And again, do we not hear continually that shortages of supplies will throw increasing numbers out of work in the nondurable goods manufacturing and service industries?

All these things are true, but let us look for a moment at what the labor situation is likely to be in late 1942.

Arithmetic Shows Shortage

Army increases now planned will probably bring the enlisted and commissioned forces to 5,000,000 men or more. Add to this the Navy, and the armed forces this year may total more than 6,000,000 soldiers and sailors. To supply this force fully with all the myriad things a modern fighting man needs will require the efforts of a labor force that may approach 30,000,000 men.

This, then, accounts for some 36,000,000 of the available manpower of the country. But the normal labor supply is at present somewhere in the neighborhood of 55,000,000 workers.

Apparently, then, there will be only some 19,000,000 workers available to meet the needs of agriculture, the service industries and the production of manufactured goods for civilian use. Compare this to the normal labor requirements of these occupations and it is also apparent that this 19,000,000 will need to be more than doubled to carry out the bare minimum of necessary work in this line.

Agriculture, for instance, will require at least 10,000,000 workers. Essential manufactures for civilians will require at least 4,000,000; trade, distribution and finance at least 4,000,000; government services (national, state and local), 2,500,000; service industries, 4,000,000; transportation, 1,500,000; construction, 1,000,000; utilities, 1,000,000; mining for civilian needs, 300,000; and at least 600,000 for forestry, fishing and miscellaneous occupations. This makes a total of around 29,000,000 workers needed, aside from armed forces and war workers, which would indicate that at least 10,000,000 workers must be drawn from some yet untapped sources.

This means that the food industries, in particular, must not only arrange to keep their labor force at the 950,000 level recorded in the last census, but must increase this labor force sufficiently to meet the added requirements growing out of the necessity of supplying large quantities of food to the United Nations.

Must Train Replacements

What are the prospects for accomplishing this task? Let us look first at the unavoidable consequences of the selective service method of building up the necessary combat forces.

We are told that men from 20 to 27, inclusive, will do most of the fighting. Men of those ages, who, for physical defects or other disqualifications, are not suitable for the fighting forces, but who are reasonably sound physically, will be called. Some of these may be put into special work in industry. The others likely will be assigned to military work they are fit to do.

Men over 27 years of age probably will be used to some extent in combat units. Practically all physically fit men over 27 and up to 35 years of age are likely to be called to the armed forces unless others to take their places in industry cannot be trained in reasonable time.

Many jobs done by men in the past will have to be done by women as wartime conditions cause a shortage of male labor. In this meat cutting room the major operations are performed by men, but women (extreme right) trim the trimmings. It is only one step from this to the use of women on the main cutting and trimming line.

This does not mean that vitally necessary food production will be hindered by the immediate calling of these men. But it does mean that their deferment, where it is granted because a worker is vitally necessary to operation of the plant, is only temporary.

To protect themselves, therefore, the food processing industries must immediately begin to train replacements for those of their skilled and semi-skilled workers falling in the age classification 20-35 years. Men outside those ages will also be registered, for military service up to 44 years, and for other services from 18 to 20 years and from 45 to 65 years. Replacements for these nonmilitary classifications also should be contemplated, for some of these men will undoubtedly be called by the government for special services.

Will Have to Use Old, Infirm

The general prospective labor shortage will, however, make it necessary for food processing plants to draw into their employ many who have never before been included in the labor forces of the country. As to men, it will be not only advisable but necessary to draw upon older, retired men and upon those who, because of physical handicaps, have not been considered as part of the nation's total labor supply. That this can be done is evidenced by the experience of many companies. In almost any plant, useful work can be done in clerical and similar jobs by those too old for active production jobs. Also, those who, through injury or other infirmity, have never been trained for productive jobs can by special training and arrangements be fitted to become useful workers.

Finally, the food processing industries can draw on women for their workers to a far greater extent than has been yet done. True, the food industries already employ many women. But there are still many comparatively light jobs in which men workers can be replaced by women.

So far, most of the women workers in food plants have been the young or unmarried. If more married women are to be employed it may be necessary to make arrangements for caring for their younger children. This is done all over Europe today.

In any case, whether the food processor employs the expedients suggested here or takes other steps, it is necessary that he recognize the approaching labor shortage and take steps to meet it. Only in that way can he do his part in this war and assure to our fighting men, our allies and our nation an ample supply of wholesome, nutritious food.

Preventive Truck Maintenance a 'Must'

Deferred repair and servicing must be discarded for the duration. Systematic check-up of every vehicle and immediate repairs prevent minor troubles from becoming major ones

NOW is the time when preventive truck maintenance will pay rich dividends in the upkeep of the smallest to the largest truck fleets in the food field. With both passenger car and truck production stopped altogether or war use priorities affecting what few vehicles may be built, civilian truck users in the food field will find it extremely difficult, if not impossible, to buy new truck equipment for the duration.

Hence, definitely out is the old policy of allowing units in a fleet to get into such poor mechanical condition by deferred maintenance that it is cheaper to buy new trucks than to repair the old ones. There are no new ones to buy. Accordingly, for the duration, food companies must find some means for keeping their present trucks running.

FORM DSA 629 **CHEVROLET PREVENTIVE MAINTENANCE ORDER**
PASSENGER CARS AND TRUCKS

Operation No. 1—General Inspection and Lubrication Every 1000 Miles

Car No._____ Dealer Repair Order No._____ Date_____

Owner's Name_____ Car Serial No._____

NOTICE: No work other than that listed hereon to be performed without specific authorization

√—IF O. K. X—ADJUSTMENTS MADE O—REPAIRS DESIRABLE

- ☐ 1. Lubricate Car.
- ☐ 2. Change Engine Oil—(if ordered). Engine Hot.
- ☐ 3. Clean Air Cleaner—(Fill oil bath type to proper level with SAE 30 Oil).

While Lubricating Vehicle—Thoroughly Inspect the Following—No Charge Except for Extra Lubricant Used. Any Work Ordered Performed as a Result of this Inspection Will Be Charged for at Regular Flat Rate.

- ☐ 1. Check Steering Gear oil level. Add lubricant if necessary.
- ☐ 2. Check Radiator and Hose Connections for leaks.
- ☐ 24. Check reading of Heat Indicator.
- ☐ 25. Indicate condition of Fenders... Body

Paint Decalcomanias

This Inspection Indicates That The Following Repairs Are Desirable

Description of Suggested Repairs	Estimated Cost		
	Parts	Labor	Total

Cutaway reproduction of the Chevrolet preventive maintenance form used for general inspection and lubrication after every 1,000 miles of operation. While originally intended for use by Chevrolet dealers, the form and procedure may be used with equally good results by Chevrolet fleet owners maintaining their own shops.

INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)

Form CT 128. 531—12-21-38. Printed in United States of America.

INSPECTION AND SERVICE REPORT

MOTOR TRUCK SALES DEPT._____ BRANCH HOUSE. DATE_____

Owner R.F.D. or St. and No. City or Town State

Model_____ Serial No._____ Engine No._____ Year Purchased_____ Mileage_____

1. O.K.
2. Should be adjusted
3. Should be tightened
4. Should be repaired
5. Should be overhauled
6. Should be replaced
7. Refer to "Remarks" at bottom of this sheet

Indicated code number in proper column following item.

	Engine Attention	Attention Given		Engine Attention	Attention Given		Engine Attention	Attention Given
1. Cab (General)			32. Cylinder Head			63. Toe Boards		
2. Body (General)			33. Cyl. Head Studs			64. Floor Boards		
31. Hose Connections			62. Seat Cushions			93. Condition of Rims—Rear		

REMARKS:_____

The International Harvester Co.'s inspection and service report which can be used as the basis for preventive maintenance by International factory branches and dealers and by fleet users doing their own repair work. Note that a total of 93 separate parts are inspected under the system.

FORM DSA 630

CHEVROLET PREVENTIVE MAINTENANCE ORDER

PASSENGER CARS AND TRUCKS

Operation No. 2—General Inspection, Adjustment and Lubrication Every 5000 Miles

Car No. _____ Dealer Repair Order No. _____ Date _____

Name of Dealer _____ Address _____

NOTICE: No work other than that listed hereon is to be performed without specific authorization

V—If O. K. X—ADJUSTMENTS MADE O—REPAIRS DESIRABLE

A—TUNE ENGINE—Which Includes the Following Inspection and Adjustments.

- ☐ 1. Check, Clean, and adjust Spark Plugs.
- ☐ 2. Check, Square, Lubricate and Set Distributor Points. Fill Distributor Shaft Grease Cup.
- ☐ 3. Check and Clean Distributor Cap.
- ☐ 20. Adjust Carburetor. Use Vacuum Gauge when possible. Adjust for proper idling speed.
- ☐ 21. Check and Adjust Clutch Pedal for proper clearance. Lubricate Throw-Out Bearings. '37 and earlier.
- ☐ 22. Check reading of Heat Indicator.
- ☐ 27. Check Manual Choke.
- ☐ 28. Check All Lights. (Does not include focusing).

B—GENERAL TIGHTEN-UP—Which Includes the Following Inspection and Adjustments.

- ☐ 1. Check and Adjust Steering Gear.
- ☐ 2. Check and Adjust Drag Link and Front Axle Tie Rod Connections and Pitman Arm.
- ☐ 3. Check Front Wheel Bearings. (Remove—clean and inspect. Lubricate—see Lubrication Chart).
- ☐ 4. Tighten Radiator and Front Fender Support Bolts.
- ☐ 5. Tighten Front Wheel Hub Bolts.
- ☐ 6. Tighten Front Bumper Bolts.
- ☐ 7. Tighten Front Engine Support Bolts.

C—GENERAL LUBRICATION—Which Includes the Following Inspections. Extra Charge for Lubricant Added.

- ☐ 1. Lubricate Car.
- ☐ 2. Change Engine Oil—(if ordered). Engine Hot.
- ☐ 5. Lubricate Rear Wheel Bearings — (1½ ton — 10,000 miles at extra charge).
- ☐ 6. Lubricate all Door and Trunk Hinges, Bumpers, Locks and Handles.
- ☐ 7. Check and fill Storage Battery.
- ☐ 8. Rear Spring Covers Should Be Lubricated each 10,000 miles at extra charge.

THIS INSPECTION INDICATES THAT THE FOLLOWING REPAIRS ARE DESIRABLE

Chevrolet preventive maintenance sheet giving the general inspection, adjustments and lubrication to be covered at 5,000-mile intervals.

One of the oldest and surest means of keeping trucks running, and at a minimum of expense, is to employ a system of preventive maintenance. Such a system involves systematic and periodic inspections by means of which the need for future repairs can be detected and anticipated. If minor repairs found necessary as the result of the inspections are made immediately, they cost less than if they are permitted to develop into major repairs requiring parts replacements. In wartime, replacement parts get more and more difficult to obtain and prices are higher than normal.

There is no monopoly on preventive maintenance systems. They are simple and consist of periodic inspections, usually at 1,000- and 5,000-mile intervals.

At each inspection certain-operations are performed, and if faults are found these are corrected before the truck is put back into service.

Forms employed in two of the most widely used preventive maintenance systems are shown. One is that provided by Chevrolet's fleet sales division. The Chevrolet form Nos. are DSA 629 and 630, the former specifically outlining the parts to be inspected and the operations performed after each 1,000 miles of operation. The latter covers the work to be done at 5,000-mile intervals.

The other preventive maintenance system is that used by the International Harvester Co. at its factory branches and by its dealers.

Food Jars Simplified

SHORTAGES of metal will create a heavy demand for glass containers. But production of glass jars is limited by the supply of raw materials available and by manufacturing capacity. So the Division of Simplified Practice, National Bureau of Standards, U. S. Department of Commerce, Washington, D. C., is working out a simplification program to eliminate odd sizes, shapes and finishes.

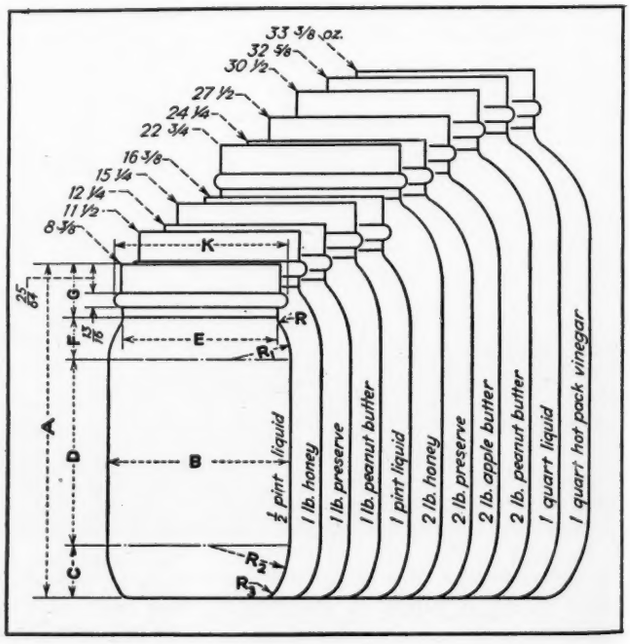
To this end, Glass Container Association was asked to design a simplified line of containers. It has completed the design of such a line for products such as preserves, jams, jellies, fruit butters, peanut butter, mustard, mayonnaise, pickles, relish and mince meat. The accompanying diagram illustrates the significant features of these jars.

The Division of Simplified Practice has requested food processors to look over the recommended sizes and indicate the absolute minimum number of sizes needed. After consideration of reports from the industry, an Emergency Simplified Practice Recommendation will be promulgated.

Capacity overflow	Weight	A	B	C	D	E	F	G	K	R	R_1	R_2	R_3	400 finish size
8⅜ oz.	5	4 3/32	2.512	11/16	2 3/8	2.125	33/64	41/64	2.312	1/16	5/8	1 1/8	7/32	58 mm.
11½ oz.	6⅛	4 15/32	2.750	43/64	2 7/8	2.125	7/8	41/64	2.324	1/16	1 1/4	1 9/32	1/4	58 mm.
12¼ oz.	6½	4 17/32	2.781	43/64	2½	2.125	7/8	41/64	2.324	1/16	1 13/64	1 9/32	1/4	58 mm.
15¼ oz.	7½	5⅛	3.010	11/16	2 11/16	2.375	33/64	41/64	2.562	1/16	1 3/16	1 21/64	1/4	63 mm.
16⅜ oz.	7⅞	5 3/32	3.090	11/16	2 41/64	2.375	1/8	41/64	2.562	1/16	1 5/16	1 21/64	1/4	63 mm.
22¾ oz.	10	5⅞	3.460	11/16	3 11/64	2.375	1 1/16	41/64	2.562	1/16	1 3/16	1½	5/16	63 mm.
24¼ oz.	10¼	5 11/64	3.531	11/16	3 7/32	2.375	1 1/16	41/64	2.562	1/16	1 5/32	1 17/32	5/16	63 mm.
27½ oz.	11¼	6¼	3.679	1	3 21/64	2.375	1⅛	47/64	2.562	1/16	1 5/16	1 9/16	3/8	63 mm.
30½ oz.	11¾	6 5/16	3.758	1 1/32	3 23/64	2.375	1 3/16	41/64	2.562	1/16	1¼	1 9/16	3/8	63 mm.
32⅝ oz.	12	6¾	3.828	1 1/16	3 41/64	2.375	1¼	47/64	2.562	5/32	1 13/64	1¾	3/8	63 mm.
33⅜ oz.	12¼	6 13/16	3.859	1 3/32	3 45/64	2.375	1 3/32	41/64	2.562	1/4	1 5/64	1 23/32	3/8	63 mm.

Notes—1. Any standard GCA glass finish suitable to the jar body may be used.
2. For finishes other than specified GCA No. 400 shallow continuous thread use comparable sizes to GCA No. 400 as follows; GCA 400, GCA 140, GCA 800 and GCA 2900; 58, 63. GCA 1400; 63, 66. GCA 1700; 55, 60.

Line of glass-saving, closure-saving and carton-saving plain round jars proposed for such foods as preserves, jams, jellies, fruit butters, peanut butter, mustard, pickles, relish and mince meat by National Bureau of Standards.



NEW PACKAGES & PRODUCTS

Keeps Avocados Fresh

La Habra Heights Avocado Association, La Habra, Calif., is wrapping its product in transparent cellulose after experimenting for more than a year seeking a packaging material which would preserve the avocado's freshness. Avocados "breathe," and if unprotected, deteriorate rapidly. The new transparent wrapping, however, is slightly permeable, permitting enough air to enter to keep the fruit in perfect condition during shipment.

Another headache to avocado growers has been the ripening qualities of the fruit. Retarded by refrigeration, the fruit ripens too quickly when it comes out of cold storage. But when the fruit is wrapped in transparent cellulose, the ripening process is slower, and the avocado retains its bright green skin until fully ripe. The packaging material also adds to the attractiveness of the fruit and pushes sales.

Agar-Agar Substitute

Two years ago T. H. Angermeier & Co., New York, began testing its new collodial product, "Veg-A-Loid," developed as a stabilizing agent for a variety of food and drug products. With the present shortage of Japanese agar-agar, Veg-A-Loid has been introduced as a substitute in formulas and mixtures.

The colloid is said to be comparable to agar-agar in weight, texture and ease in handling, and the cost to food manufacturers is approximately the same. The product may be used as a stabilizer in the preparation of baked goods.

Label Pictures Contents

For the 1942 season, Cascade Frozen Foods, Inc., Seattle, Wash., is dramatizing its products in a new package—one with natural color photographs applied to a transparent cellulose wrapper. The new label more easily identifies the contents of each package and has decided appetite appeal. Golden ripe

"Jack Frost" peaches are reproduced on the label through natural color photographic process. The Cascade line is comprised of 17 different fruits and vegetables processed under inspection of the U. S. Agricultural Marketing Service, and several of this number are put up in the new package.

Cascade's colorful package lends itself especially well to the visible display cases in retail outlets. Imprinted white wax paper wraps, of the type still extant through the frozen pack industry, were formerly used by Cascade.

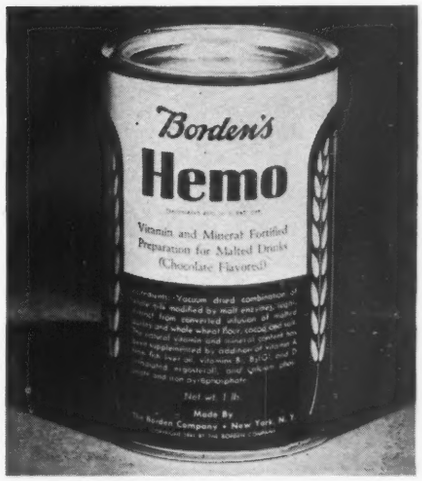
New Breakfast Food

Latest among the ever-growing ranks of breakfast foods is Sherman's "Arcadia Redi-Meal," a ready-to-serve breakfast cereal. Redi-Meal, prepared from whole wheat grain in flake form, wheat germ, soya and raisins, contains vitamins B, E and G, with some vitamin A. The soy milk powder used in Redi-Meal is rich in proteins obtained from the soybean. Lecithin is also present.

Marketed in a 16-oz. container, Redi-Meal can be served with honey or sugar and cream, served with fruits, or sprinkled on salads.

Vitamin-mineral Drink

Elsie, the Borden cow, is publicizing the merits of a new chocolate-flavored milk product, introduced nationally by the Borden Co., New York. According to Elsie, one ounce of "Hemo," a preparation in powdered form, contains the daily minimum vitamin requirements of adults for vitamins A, B_1, B_2, D; iron, calcium and phosphorous.



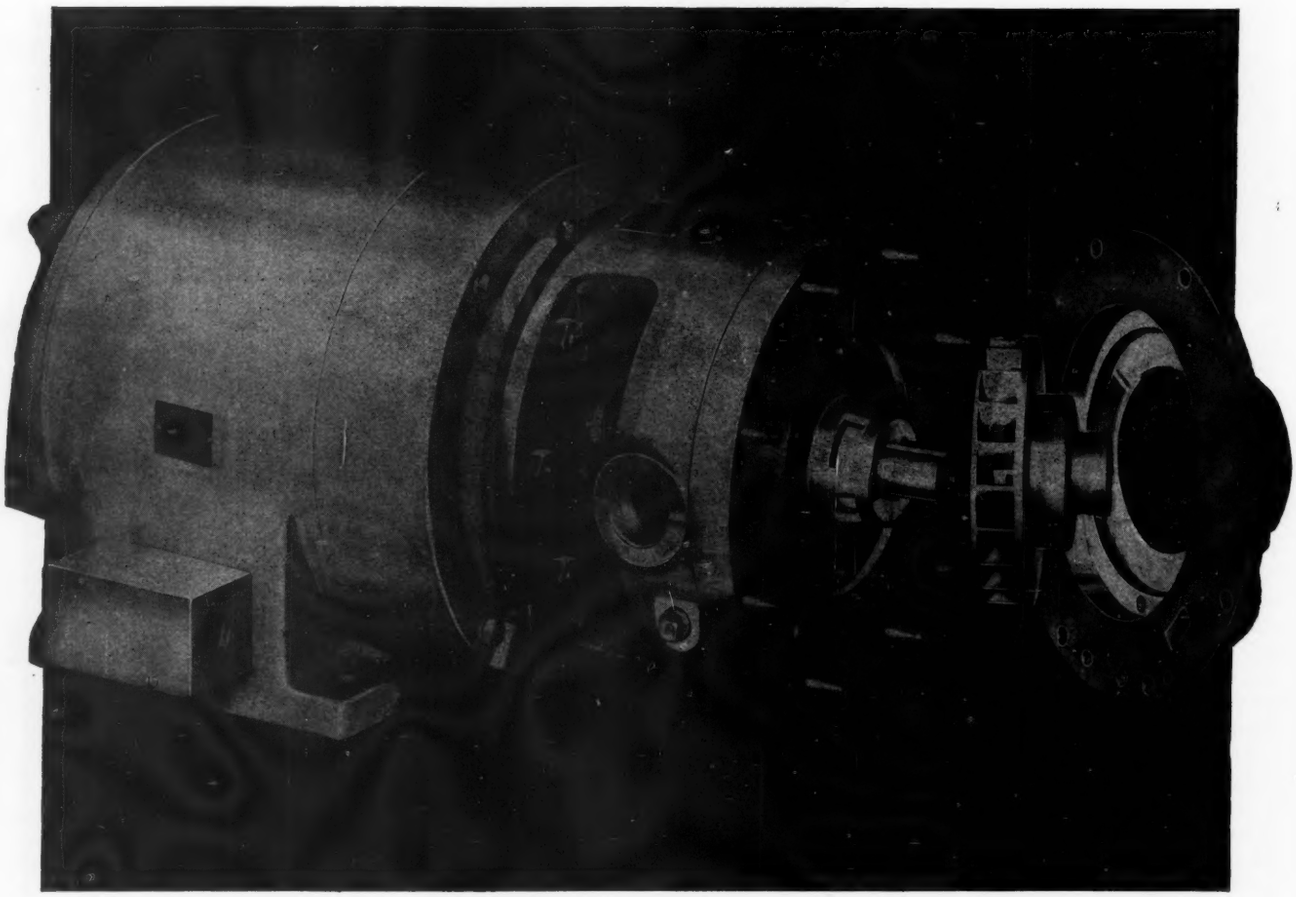
Two teaspoons of Hemo in a glass of milk are said to equal the vitamin A content of three boiled eggs, the vitamin B_1 of four slices of whole wheat bread, the vitamin B_2 found in four servings of spinach, the vitamin D content of three servings of beef liver, plus the iron in half pound of beef, and the calcium and phosphorous in two servings of cauliflower and cooked green beans combined.

Ingredients of the product include vacuum-dried whole milk modified by malt enzymes, sugar, extract from converted infusion of malted barley and whole wheat flour, cocoa and salt, vitamin A from fish liver oil, vitamin B_1, B_2 and D, calcium phosphate and iron phosphate. Consumer tests in Connecticut indicate wide public acceptance of the product.

NASH CLEAN-AIR COMPRESSORS

(TRADE MARK REG.)

are Long Life compressors, because they have no internal wearing parts



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

THE NASH ENGINEERING COMPANY

220 WILSON ROAD, SOUTH NORWALK, CONNECTICUT, U. S. A.

Tin Conservation Order Hits Long List of Foods

Some banned from tin entirely. Many more limited to fraction of 1940 pack. Can sizes limited

THE LONG-AWAITED and much rewritten tin container conservation order was issued February 12 (effective at once) by the War Production Board. Two lists of food products are appended to the order, together with size restrictions for each commodity—and products *not listed may not be packed in tin-plate containers*. The lists of food products *which still may be packed in tin*, and the limits on such packaging, are printed in full with this article.

Food products which are banned from tin containers include coffee, beer, dog food, dried beans and pork and beans, baking powder, cereals and flour, spices and condiments.

In addition, all except a restricted list of products must hereafter be packed in black plate coated with 1.25 lb. of tin per base box of plate. Exceptions which may still be packed in 1.50-lb. tin plate containers are sauerkraut, pureed vegetables and fruits, berries, cherries, plums, prunes, lemon juice, phenols and cresols, glycerine, jams, jellies and preserves (as otherwise authorized), pectin, nicotine sulphate and pickles. Packaging will be done principally in Nos. 2, 2½ and 10 cans.

Canners are specifically directed by the order to:

1. Concentrate to the "greatest extent practicable" upon larger size cans.
2. Substitute for tin containers, containers made of other materials to the extent "feasible and practicable."
3. Use a minimum amount of solder with a minimum amount of tin content to seal cans.

Numerous other limitations and procedural instructions are detailed in the order, making reading of the text a necessity for every canner. Copies may be obtained from WPB and from field offices—it is identified as Conservation Order M-81.

WPB estimates that the order will reduce the 1941 consumption of 40,000 tons of tin for containers by at least 15,500 tons this year. The drastic step is considered necessary because of the fact that the Far Eastern situation, at least temporarily, has cut off America's major source of tin. The government smelter being built in Texas to use Bolivian ore will not be ready until summer—its capacity is less than 20,000 tons annually, some of which must be reserved for Britain.

Generally speaking, the order recognizes the canned food goals set by the Department of Agriculture for Lease-Lend purchase and the requirements for the military forces. Products classified as "primary products" may be packed in unlimited quantities—examples are peas, tomatoes, corn, asparagus, pectin, peaches, pears—but only in can sizes and styles listed. Virtually all other fresh fruits and vegetables are included under the "secondary products" classification, for which the pack is limited to 100 percent of the 1940 pack or less and to the sizes and styles listed.

Following are the two lists covering limitations on packing of food products in tin containers ordered by the War Production Board:

Table I—Primary Products

There is no present limit upon the amount of tin or of the number of containers which may be used to pack products in this list, within the restrictions appearing with each product.

Fruits

1. *Fruit Cocktail and Fruits for Salad*, including any combination of Fruits otherwise included on Table I and Table II, but containing at least 50 percent fruits on Table I, and only in No. 1 Tall, No. 2, No. 2½, or No. 10 cans. Said Fruit Cocktail and Fruits for Salad are not to be packed from contents of other tinplate cans except to the extent of 10 percent by weight of said Fruit Cocktail or Fruits for Salad and in no case except where such 10 percent by weight consists of Pineapple or Maraschino Type Cherries which have come from No. 10 or larger cans.

2. *Peaches, Clingstone*, and *Pears*. Halves, Segments, Slices, only in No. 2, No. 2½, or No. 10 cans. Whole Peaches and Whole

ECONOMY JARS

Fancy shapes and sizes of glass containers will be replaced by a few sizes of a simplified design to save glass, metal (in closures) and paperboard (in cartons). Here is a line of containers designed by Glass Container Association and proposed by the government for foods such as preserves, mayonnaise and peanut butter (see page 62 for specifications). Similar simplified designs probably will be extended to milk bottles, packers jars, juice bottles and jars and catsup bottles.

Pears not to be packed.

3. *Pectin, Dry and Liquid*, only in 5 gal. or larger cans.

4. *Grapefruit, Lemon, Lime, Orange Concentrates*, including, but not limited to dry, powdered, dehydrated juices from the same fruits, with or without drying promoters, but only in No. 1 Picnic or larger cans.

5. *Peaches, Freestone*, only in No. 2, No. 2½, or No. 10 cans, except in California for which see Table II.

Vegetables

1. *Asparagus*, only in No. 2, No. 2½, No. 10, No. 1 Square, or No. 2½ Square cans.

2. *Beans*, packed fresh, including but not limited to Green, Wax, Fresh Shelled, Lima, and Green Soybeans, and only in No. 2, No. 2½, or No. 10 cans. Dried beans and peas are not to be packed.

3. *Corn*, only sweet, cut, and only in No. 2 or No. 10 cans; or in No. 2 Vacuum cans, dry pack only. Corn on cob not to be packed.

4. *Peas*, only fresh green, and only in No. 2 or No. 10 cans.

5. *Tomatoes*, only in No. 2, No. 2½, or No. 10 cans.

6. *Tomato Paste, Sauce, Catsup, Chili Sauce*, only in No. 10 or larger cans. See Table II.

7. *Tomato Pulp or Puree* in No. 1 Picnic, No. 2, No. 2½, No. 10, or 5-gal. cans. The foregoing Tomato products packed in 5-gal. or larger cans may be repacked in other tinplate cans either unchanged or in combination with other products.

8. *Baby-Foods-Vegetable Purees, and Chopped Foods (for Human Consumption only)*, but only if packed for these purposes in 1941; and only in No. 202 B. F. (202 x 214), No. 211 B. F. (211 x 210), No. 2, or No. 10 cans.

In respect to the following products above-listed on this Table I, under the heading of "Vegetables", being respectively Green and Wax Beans, Corn, Peas, and Tomatoes (Item 5), a canner who lacks adequate machinery, equipment or plant facilities for packing his entire 1942 pack of such products in No. 2, No. 2½, or No. 10 cans may, upon application to the War Production Board, pack the excess of his 1942 pack of such products in No. 303 cans, if said canner is currently equipped to pack such products in No. 303 cans and did so in 1941.

Juices

1. *Tomato Juice* (which may contain up to 30 percent other vegetable juices), only in No. 2, No. 2 Cyl., No. 3 Cyl., or No. 10 cans.

In respect of Tomato Juice, a canner who lacks adequate machinery, equipment or plant facilities for packing his entire 1942 pack of such product in No. 2, No. 3 Cyl., or No. 10 cans may, upon application to the War Production Board, pack the excess of his 1942 pack of such product in No. 211 Cyl. or No. 300 cans, if said canner is currently equipped to pack such product in No. 211 Cyl. or No. 300 cans, respectively, and did so in 1941.

FOOD-FOR-FREEDOM LABELS

The free peoples of the world will recognize by this design the foods which they receive from the United States. Created by Walt Disney, and presented to Secretary Claude R. Wickard in recognition of the vital part United States food is playing on the war fronts of the world, the eagle-over-ship emblem is available for voluntary use by packers. There is also a design in color—blue eagle over red background broken by white stars and bars.

In respect of each product above-listed on this Table I under the headings of "Fruits, Vegetables, and Juices", a canner who lacks adequate equipment, machinery, or plant facilities for efficient packing of such product in any can size or sizes specifically designated therefor on this Table I may pack such product in a larger can (other than a No. 12 can) if (*a*) said canner is currently equipped to pack such product in such larger can and did so in 1941, and (*b*) such larger can is recommended for such product by the National Bureau of Standards Recommendation RI 55-40; and he may pack such product in a No. 12 can in any event.

Fish and Shellfish

1. *Salmon.*
2. *Sardines.*
3. *Tuna and Tuna-like Fishes.*
4. *Mackerel.*
5. *Alewives*, including Alewife Roe.
6. *Fish Flakes.* Dried Fish Flakes not to be packed.
7. *Crab.*

Miscellaneous Foods

1. *Cold Pack Foods*, including, but not limited to Blueberries, Strawberries, Apples, Cherries, Peaches, Asparagus, Lima Beans, Peas, but only if packed in 30-lb. or larger cans.
2. *Baby Formulas.*
3. *Evaporated Milk*, only in 14½-oz. or larger cans. See Table II.
4. *Dry Milks*, including only Dry or Powdered Whole Milk, in 1-lb., 2½-lb., 5-lb., 10-lb., or 25-lb. cans.
5. *Special Dietary Products*, including, but not limited to, Baby Foods.
6. *Honey*, but only in "5-lb." or larger cans.
7. *Dehydrated Vegetables*, only in No. 10 or larger cans.

How Metso Cleaners Prevent Waste
CONSERVE TIME
Food processing plants of all varieties vote Metso Cleaners real friends of economy. They are pleased with the prompt action in emulsifying oils and greases, and can measure the time saved.
A leading bakery, for instance, shortened the cleaning schedule for washing bread pans by hours. And a tidy sum was saved too because Metso is priced as a basic raw material.
Have you a cleaning operation in your plant that could be speeded up? Write us now.
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METSO CLEANERS
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Table II—Secondary Products

All quantity limitations relating to size of pack refer to the entire calendar year commencing January 1, 1942, except in the case of citrus fruits, for which see the seasonal basis provided in Item 8 of "Fruits" and Items 3, 4, and 5 of "Juices"" below. Such quantity limitations, moreover, refer to the amount of tinplate used in packing rather than to the amount of product packed. Where no specific percentage limit is listed the limit is 100 percent of the 1940 pack. The quantity limits imposed by this Table relate only to the pack permitted for civilian consumption. To the extent of additional requirements by the Army, Navy, Lease-Lend or other U. S. Governmental Agency, such pack may be increased.

Fruits

1. *Apples and Crabapples*, only in No. 10 or larger cans. Whole Apples, Apple Butter not to be packed. 75 percent of 1940 pack.
2. *Apple Sauce*, including sauce from Crabapples, only in No. 2 or No. 10 cans.
3. *Apricots*, only in No. 2½ or No. 10 cans. Whole apricots not to be packed. 75 percent of 1940 pack.
4. *Berries*, including but not limited to Blackberries, Blueberries, Huckleberries, Loganberries, Raspberries, Strawberries, only when packed as berries, and only in No. 2, No. 2½ or No. 10 cans.
5. *Cherries*, including but not limited to Red-Sour-Pitted and Sweet, only when packed as cherries, and only in No. 1 Tall, No. 2, No. 2½, or No. 10 cans.
6. *Cocoanuts*, only shredded with milk, and only in No. 10 cans.
7. *Cranberries*, including Cranberry Sauce, only in No. 300, No. 2, or No. 10 cans.
8. *Grapefruit* and *combination of Oranges and Grapefruit*, including only Segments, Sections, and Slices and only in No. 2, No. 2½, or No. 5 cans but 100 percent of 1941 pack.
9. *Olives*, only Ripe, and only in No. 1 Tall, No. 2, No. 2½, or No. 10 cans and only 50 percent of 1941 pack.
10. *Peaches, Freestone*, 75 percent of 1940 pack in California, only in No. 2, No. 2½, or No. 10 cans.
11. *Pineapple*, including only Sliced, Crushed, Tidbits, and only in No. 2, No. 2½, No. 3 Cyl., or No. 10 cans. Spears not to be packed.
12. *Plums* and *Fresh Prunes*, only in No. 2½ or No. 10 cans. 50 percent of 1940 pack.

Vegetables

1. *Beets*, only in No. 2, No. 2½, or No. 10 cans. 75 percent of 1940 pack.
2. *Carrots*, only in No. 2, No. 2½, or No. 10 cans. Whole Carrots not to be packed. 75 percent of 1940 pack.
3. *Carrots and Peas*, only in No. 2, No. 2½, or No. 10 cans. 75 percent of 1940 pack.
4. *Pimentos and Peppers*, only in No. 2, No. 2½, or No. 10 cans. 50 percent of 1940 pack.
5. *Pumpkin* and *Squash*, only in No. 2½ or No. 10 cans. 50 percent of 1940 pack.

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NEW MACHINES

If you require new wrapping machines to meet new needs, don't hesitate to call on us—particularly if your production is essential to the Nation's war effort.

Our experience in assisting manufacturers to overcome present packaging problems may prove of value to you. So why not bring your problems to us? Our nearest office is there to serve you.

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Over a Quarter Billion Packages per day are wrapped on our Machines

BETTER POTATO CHIPS

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FERRY CONTINUOUS POTATO CHIP MACHINES

Slicing, washing, frying, drying, salting and delivery to containers—all are automatic and continuous, with the result that the chips are uniformly better, all day and every day. None are underdone, burnt, rancid or greasy, and they cost you much less per pound to produce than by any other method . . . Be the first in your territory to adopt and cash in on the FERRY METHOD . . . Made in 6 sizes with capacities from 50 to 350 lbs. of finished chips per hour.

Write today for the complete data contained in Bulletin F. I.

J. D. FERRY CO.

129 South Cameron Street

HARRISBURG, PA.

6. *Rhubarb*, only in No. 10 cans. 50 percent of 1940 pack.

7. *Sauerkraut*, 50 percent of the present bulk kraut holding, and only in No. 2, No. 2½, or No. 10 cans.

8. *Spinach*, and other Green Leafy Vegetables, only in No. 2, No. 2½, or No. 10 cans.

9. *Okra*, only in No. 2, No. 2½, or No. 10 cans.

10. *Tomato Products* (See Table I)

Paste, only in 6Z cans.

Sauce, only in 8Z Short cans.

Above tomato products may be packed in whole or part from contents of other tinplate cans of 5-gal. or larger size.

11. *Vegetables, Mixed*, including 90 percent of any combination of vegetables included on Table I and Table II, but no potatoes to be included; only in No. 2, No. 2½, or No. 10 cans. 75 percent of 1940 pack.

12. *Succotash*, only when made from fresh or frozen vegetables, and only in No. 2 or No. 10 cans. 100 percent of 1941 pack.

Juices

1. *Lemon Juice* and *Lime Juice*, only in 8Z Tall, No. 2, or No. 10 cans. 50 percent of 1940 pack.

2. *Pineapple Juice*, only in No. 2, No. 3 Cyl., or No. 10 cans.

3. *Grapefruit Juice*, only in No. 2, No. 3 Cyl., or No. 10 cans. 125 percent of 1940-1941 pack.

4. *Orange Juice*, only in No. 2, No. 3 Cyl., or No. 10 cans. 125 percent of 1940-1941 pack.

5. *Combination of Grapefruit and Orange Juice*, only in No. 2, No. 3 Cyl., or No. 10 cans. 125 percent of 1940-1941 pack.

6. *Fruit Nectars*, only in 211 Cyl., No. 2, No. 3 Cyl., or No. 10 cans.

In respect of each product above-listed on this Table II under the heading of "Fruits, Vegetables, and Juices", a canner who lacks adequate equipment, machinery, or plant facilities for efficient packing of such product in any can size or sizes specifically designated therefor on this Table II may pack such product in a larger can (other than a No. 12 can) if (*a*) said canner is currently equipped to pack such product in such larger can and did so in 1941, and (*b*) such larger can is recommended for such product by the National Bureau of Standards Recommendation R155-40; and he may pack such product in a No. 12 can in any event.

Miscellaneous Foods

1. *Canned Condensed Soups*, meaning soups packed in condensed form so that, when prepared for serving at the table, at least a can of water or other liquid is added to a can of soup to make a soup representative of its class. Such canned condensed soups to be packed only in No. 1 Picnic or larger cans; and to be only soups that are produced from products included on Tables I or II. 100 percent of 1941 pack.

2. *Canned Soups, Broths, Chowders*, other than canned Condensed Soups. 25 percent of 1940 pack. Not to be packed after June 30, 1942.

3. *Condensed Milk, Goats' Milk*, only in 14-oz. or 15-oz. cans.

4. *Malted Milks*, only in 1-lb., 5-lb., 10-lb., or 25-lb. cans; Modifications of Milk, except Filled Milks.

5. *Eggs, frozen*, only in 10-lb. and larger cans.

6. *Liquid Oils*, Vegetable, Marine, and Animal, or edible blends of such oils, only in 1-qt. or larger cans.

7. *Hardened Edible Oils* and *Unhardened* or *Hardened Lard*, and *Rendered Porkfat*, and *Edible Tallow*, and animal, vegetable, and marine blends thereof only in 3-lb. or larger cans, and only at rate of 100 percent of 1940 rate for first half year and only 60 percent of 1940 rate after June 30, 1942.

8. *Sweet Syrups*, including only Cane, Maple, Molasses, Corn, and Sorghum Syrup, and only in 5-lb. cans or larger cans.

9. *Evaporated Milk*, only in 6-oz. cans. See Table I.

10. *Frozen and Storage Cream*, only in re-use cans and only in nested style 45-50 lb. cans.

Meats

1. *Beef, Veal, Mutton* (corned, roast, or boiled; only for human consumption).

2. *Brains*, only in 10½-oz. or larger cans. 75 percent of 1940 pack.

3. *Chili Con Carne* when not packed with beans, only in 1-lb. cans.

4. *Meat Loaf* containing at least 90 percent meat and no added water. 75 percent of 1940 pack.

5. *Meat Spreads*. 50 percent of 1940 pack.

6. *Sausages in casings.*

(a) *Vienna Sausage*, only in 4-oz. or larger cans. 75 percent of 1940 pack.

(b) *Sausage in Oil*, or *Lard*, or *Rendered Pork Pack*, only in No. 5 or larger cans. 75 percent of 1940 pack.

(c) *Other Sausages* in Casings, only in 12-oz. or larger cans, and only 25 percent of 1940 pack.

7. *Bulk Sausage Meats*, only in 12-oz. or larger cans. 125 percent of 1940 pack.

8. *Tongue*, whole only, 75 percent of 1940 pack.

9. *Boned Chicken* or *Turkey*, only in 1-lb. or larger cans.

10. *Chopped Luncheon Meats*, only in 12-oz. or larger cans. 125 percent of 1940 pack.

11. *Meat* (potted), only in 3 oz., 5 oz., or larger cans. 125 percent of 1940 pack. (Smaller sizes limited to 50 percent of 1940 pack.)

Fish and Shellfish

1. *Shad.*
2. *Clams, Mussels.* (Whole and Minced).
3. *Oysters.*
4. *Shrimp.*

Fish and Shellfish

(For refrigeration shipments, fresh)

1. *Oysters, Shrimp, Clams, Scallops, Crabs:* only when shucked, and only in 1-lb., 1-gal., or larger cans. 100 percent of 1941 pack.

2. *Fish Fillets*, only in 20-lb. or larger cans. 100 percent of 1941 pack.

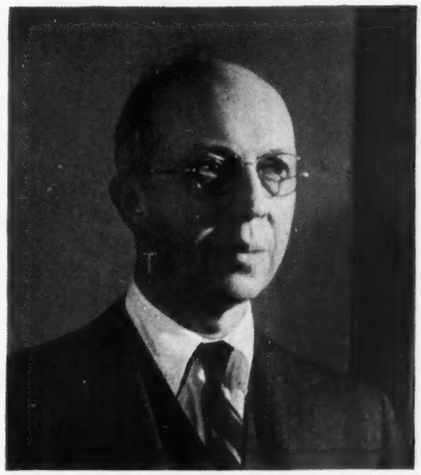
Food Supply Agency Puts Emphasis on Processing

Supply branch now a unit in Industrial Operations Division of WPB. Curtice president heads it

THE Food Supply Branch has been removed from the purchases division in the abolition of OPM and is now set up as a unit in the Industrial Operations Division of War Production Board. As such its attention is being focused primarily on problems related to the production of processed foods. Tangible evidence of the new direction being taken by the Food Supply Branch was shown by the issuance of Priority Order P-115, discussed elsewhere in this issue.

Chief of the branch in its new location is Douglas C. Townson, president of Curtice Brothers Co., Rochester, N. Y., who has replaced Howard B. Cunningham. Some of the more recent appointments in the Food Supply Branch are Clyde S. Beardslee, chief of the Dairy Products Section; George C. Hannon, chief of the Restaurant Section; and Edwin J. Fitzpatrick, chief of the Food Manufacturers Section.

The latest roster of the principal members of staff of the Food Supply Branch is as follows: Douglas C. Townson, chief; F. Chapin Weed, assistant chief; Logan Morrill, assistant chief; Charles S. Smith, administrative assistant. Canned Foods Section: John L. Baxter, chief; E. A. Meyer, assistant chief; Ralph E. Arnold, consultant. Bread and Bakery Products Section: John McCarthy, chief. Food Distributors Section: Burt P. Flickinger, chief. Dairy Products Section: Clyde E. Beardslee, chief. Restaurant Section: George C. Hannon, chief. Food Manufacturers Section, Edwin J. Fitzpatrick, chief. Sugar Section, A. E. Bowman chief, and A. Alan Thomson, assistant chief.



WPB Photo

DOUGLAS C. TOWNSON

Steel Mills To Make New Container Metals

STEPS are being taken by steel companies to alleviate the tinplate situation. Inland Steel Co. has contracted with Wean Engineering Co. for the manufacture of a bonderized line of black plate to be used with a protective lacquer in the manufacture of cans as a substitute for tinplate. Equipment for making the same type of tinplate substitute has been installed by Parker Rust Proof Co., Detroit.

Inland also has begun the installation of an electrolytic tin plating plant at its Indiana Harbor Works with a capacity for plating 2,000,000 base boxes of tinplate a year. And United States Steel Corp. is building three electrolytic tinplating mills with an annual capacity of 60,000 tons each. It is estimated that these mills will save 1,800 tons of tin a year compared with the amount required in producing the same amount of tinplate in regular plate mills.

Household can collection campaigns are to be started in Pittsburgh and in the metropolitan area of New Jersey to supply detinning plants in Pittsburgh and Sewaren, N. J.

How To Fight Fire Bombs

"FIGHTING THE FIRE BOMB," the first motion picture authorized for training purposes by OCD, is available for giving instruction against incendiary bomb attacks. The film can be purchased or rented from Transfilm, Inc., 9 Rockefeller Plaza, New York.

Supreme Court Decides Two Food Firm Cases

Two United States Supreme Court decisions affecting the food industries were issued on February 2. In one ruling the Court affirmed Federal authority to regulate intrastate commerce when that business is in competition with interstate traffic. And in a unanimous decision the court denied the claim of Wrightwood Dairy Co. for exemption from a milk marketing agreement for the Chicago area on the ground that the concern operates only in Illinois.

A second decision held that Alabama and other states may not, under authority of pure food laws, stop interstate movement of raw country butter en route to a plant to be processed into renovated butter. This decision settled an appeal brought by Cloverleaf Butter Co., Birmingham, which sought to prevent state officials from seizing butter being shipped to its manufacturing plant. The firm contended that it was licensed under the Federal Renovated Butter Act and that that statute prevented Alabama from acting.

Army Wants Only Enriched Flour

Enrichment will conform with the standards set by the F&DA for commercial flour

THE ARMY announced in mid-February that it will purchase only enriched flour in the future. Detailed specifications were not immediately released but the announcement stated that enrichment will conform with standards set by the Federal Food and Drug Administration for commercial flour.

The decision puts the military in direct competition with commercial bakeries and civilian consumption for the somewhat limited quantities of enriched flour now being processed. At the beginning of the year, the Army was using 750,000 lb. of flour daily, and use is expanding all the time.

Behind the unexpected shift in the Army position on enriched flour lies a "pressure campaign" by nutritionists to get the "advertising benefits" of military adoption of the enriched products. Vice-president Wallace is understood to have personally taken a hand in getting the Army to adopt the new policy.

When enriched flour standards were set last year, the Army announced it would continue to buy regular flour for two reasons—that the Army diet is better than that of the majority of the population and, therefore, improvements in nutrition available in limited quantities but in a basic food should all be allowed to flow through normal commercial channels to the civilian population.

Stamp Plan Extended

WITH the extension of the Food Stamp program for operation in 36 additional counties in Pennsylvania, the entire state now receives benefit of the plan. It is estimated that 137,790 persons in these counties will be eligible to participate in the program.

Food Processors Should Pool Used Equipment

An Editorial Statement

As THE WPB plant conversion order goes into effect and it becomes more difficult to procure equipment for food processing, it is imperative for the essential food processing industries to find the equipment to continue in operation or to expand where needed.

The situation calls for prompt action, for, despite relatively high priorities, deliveries will be slow. And many companies, faced with the necessity of changing packaging materials and methods because of restrictions on metal cans, metal foils, cellophane and other scarce materials, will be forced to adopt makeshift methods.

Some form of food machinery pooling or exchanging is a way out as has been suggested by Washington observers. It would facilitate all-out use of all usable idle equipment. Certain food processors who may be unable to get supplies and ingredients may be forced to suspend normal operations. Yet if their equipment is capable of use in any other place the war effort is injured by such idleness. No patriotic firm will permit valuable facilities to remain indefinitely idle.

Hence, a method of pooling unused equipment is urgently needed. Perhaps it should be an equipment exchange. Possibly the larger trade associations should take the lead. Another way would be to advertise what you might have for sale or exchange, or advertise for what you may need. Also there are recognized firms that specialize in used equipment. The point is, however, that all production facilities be put to work on essential food processing. All will agree that in time of need any equipment, even if old-fashioned and partly worn, is better than none.

(The fact that a situation calling for such treatment has arisen is further evidence of the need for comprehensive over-all planning by the WPB for the needs of the essential food industry. It should be obvious to anyone that the initiative for formation of a machinery pool or exchange should have come from WPB — not from FOOD INDUSTRIES.)

Canners Get New Priority Ratings

High self-assigned preferences allowed for materials needed for repairs and for expansion

A SPECIFIC PRIORITY procedure carrying self-assigned high ratings has been issued by the War Production Board to permit canners to obtain needed materials for repair and maintenance of plants, and to add to or expand facilities in existing buildings. The system, identified as Priority Order P-115, is available throughout the 1942 pack.

The order permits assignment of an A-1-a (highest available) rating by a canner to orders for materials necessary for emergency repair or breakdown to prevent spoilage of crops, an A-3 rating to orders for materials for ordinary repair and maintenance to maintain continuous operations, and an A-3 for new equipment within a present plant. Setting up of entirely new production lines is prohibited, however, except for peas and tomatoes.

Ratings are self-assigned on orders to suppliers, by endorsing copies with this legend: "Preference Rating A—is applied hereto under Preference Rating Order No. P-115, with the terms of which Order the undersigned is familiar," which must be signed by a company officer. Where the A-1-a rating is applied telegraphic notice must be sent at once to WPB; before an A-3 is applied for new equipment, canners must obtain approval of their plans from WPB by filing Form PD-285. Application of the A-3 rating to repair and maintenance supplies orders is limited to prohibit canners from increasing inventories beyond the ratio of average inventory to average operation for the years 1938, 1939 and 1940.

Suppliers of canneries may use the same ratings for the same purposes as canners may use them, and may extend ratings assigned them on orders on their books, within the limitations provided in the order regarding inventories.

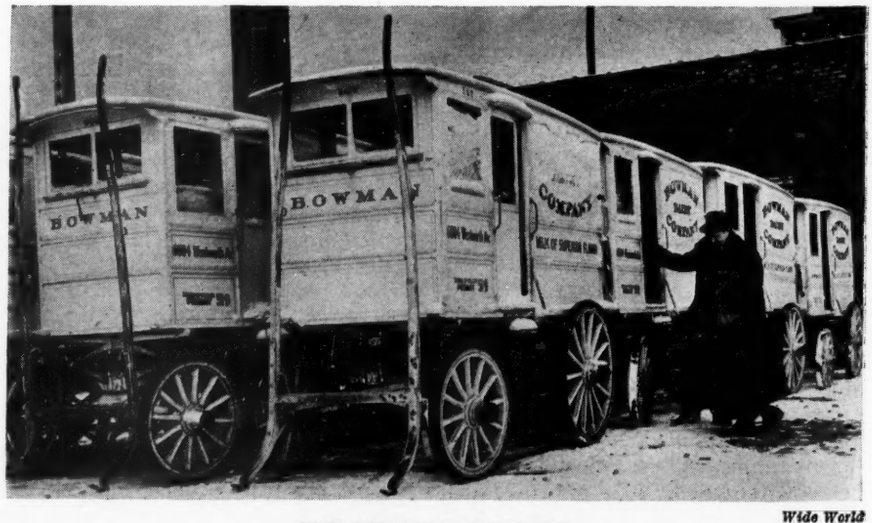
The order contains numerous minor limitations and procedural provisions which should be studied by any concern using the ratings it permits. Copies may be obtained from WPB, and probably from any field office. The ratings provided are as high as those given any industry, and indicate full recognition by WPB of the essential nature of the canning industry to the war program.

Army Surveys Drying Capacity

SMA buys dehydrated vegetables. Food value of dry foods studied. Dehydrators organize

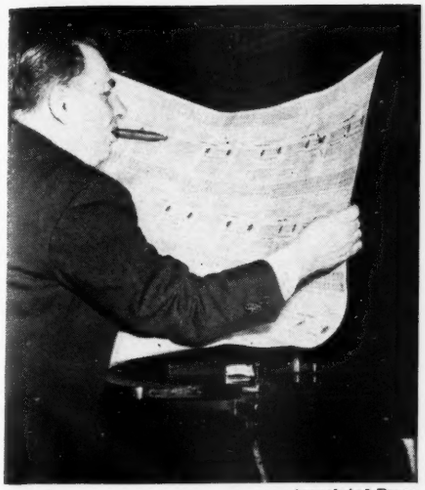
BUSINESS is looking up for the dehydrated food industries. The Quartermaster Corps has been surveying the commercial facilities for producing dried fruits and vegetables. This survey is concerned mainly with vegetables, but it also covers dried eggs and several fruits.

A study now being made by the Department of Agriculture on egg drying facilities indicates that the Lease-Lend requirements this year will approximate 200,000,000 lb. and Army requirements 12,000,000 lb. The present essential



Wide World

TIME MARCHES BACKWARD

Replaced not so long ago by the more modern delivery truck, this group of milk wagons will be reconditioned by Bowman Dairy Co., Chicago, and put back into service. This is one answer to the ban on tires for house-to-house delivery trucks—providing horses are obtainable, stables are available, etc.

Associated Press

FOOD RATIONING TICKETS

Leon Henderson looks over the first batch of tickets for sugar rationing to come off the press at the government Printing Office. The tickets are made up in the form of books and are designed for rationing articles other than sugar.

capacity is 181,000,000 lb.

For the first time since its program started, SMA made volume purchases of dehydrated vegetables in December. More than 450,000 lb. was bought.

Studies to determine the food value of dehydrated vegetables are under way. Four universities are cooperating with the Department of Agriculture in this work. Canada, too, is making tests.

Argentina is setting up an egg drying industry, and one plant with a daily capacity of 1,000,000 eggs was opened on Nov. 17. The second will be ready in March, and a third is planned

United States dehydrators have formed National Dehydrators Association. There are eleven members, and the president is Lawrence K. Harper, vice-president of Sardik Food Products Corp., New York.

Mexico Aids Meat Industry

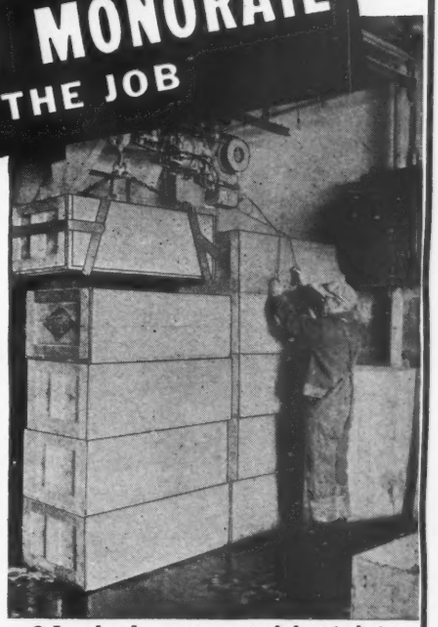
CENTRAL refrigeration and packing plants will be constructed by the Mexican government to further exportation of raw and processed meats and similar products.

U. S. Will Reserve Part of 1942 Packs

CANNERS are to be ordered to set aside for government purchase a large part of their 1942 packs of fruits and vegetables. A tentative list of the amounts to be withheld from sale was announced by John L. Baxter of WPB at the canners convention, the percentages varying from 16 percent for fruit cocktail to 44 percent for asparagus. There will be changes in the announced percentages, though probably not radical ones.

● Straight-line handling from tank to tank keeps costs low in this small cannery.

NO Production DELAYS WHEN AMERICAN MONORAIL IS ON THE JOB



● Low head arrangement of electric hoist permits high stock piling.

WITH American MonoRail Equipment you not only avoid using skilled labor for handling operations, but you also release floor space for more profitable use. Furthermore, this equipment permits accessibility to machines through narrow alleys. Machines may be grouped so that products requiring more than one operation can easily and rapidly be transferred from one machine to another.

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WPB Orders Affect Foods

Pertain to priority forms, jar rings, molasses, fats and oils, vitamin A, agar and sugar

SEVERAL orders affecting many different food industries were issued last month by the War Production Board. One applying to all industries is the ruling that applications for individual preference ratings may be filed on the new PD-1A application blanks. Preference ratings assigned on Army and Navy contracts may be issued on Form PD-3A. The most important feature of this change, made under Priorities Regulation No. 3, is that ratings assigned PD-1A and PD-3A forms may be extended to suppliers and subsuppliers by simple endorsement on purchase orders.

As a result of a WPB order issued late in January, express permission must be obtained from the WPB to consume rubber and latex in manufacturing jar rings and container sealing compounds.

National defense requirements having created a shortage of molasses, WPB late in January issued a general preference order affecting that commodity. Under this order, no one using molasses in the manufacture of yeast; citric acid; or molasses, sirup or sugar for human consumption may buy in any calendar quarter more than the amount representing the supply for the quarter. Manufacturers of feed are allowed only 55 percent of a calendar quarter supply during the first quarter of 1942 and 52 percent thereafter. Those requiring molasses for foundry purposes, however, can buy 110 percent. But vinegar manufacturers get only 75 percent in the first quarter and 70 percent thereafter. No one is allowed to use molasses in the manufacture of beverage spirits.

Also late in January, the WPB relaxed the order on fats and oils by eliminating the three months inventory restriction and substituting a restriction on processing. Under the amendment, no processor of fats and oils may produce more of this product than is required to fill his orders and to give him a practicable minimum working inventory.

The WPB acted to preserve vitamin A for human consumption (especially for military fliers) by Limitation Order L-40 prohibiting its use in multivitamin tablets, capsules, pills or liquids containing more than 5,000 units of vitamin A. Restrictions were also put upon the use of fish liver oils in feeds.

To aid the production of honey when sweeteners are short, WPD ruled that bee keepers will receive the sugar they need to keep their bees alive.

A late-January amendment to the sugar order (M-55) limited the amount of sugar available during February to industrial users, wholesalers and jobbers to 80 percent of the amount used or sold by such receivers in February, 1941.

A mid-February order M-98 allocated raw cane sugar to the refiners and put manufacturers using raw sugar under the same restrictions as those using refined sugar under order M-55. A twin to M-98 covering beet sugar was expected to be issued shortly. It was also announced that March sugar allocations for industrial consumers were to be 80 percent of the amount used or resold during the same month last year.

The users of Agar felt the effects of the war in the far east when the WPB issued Priority Order M-96 freezing all supplies of that commodity in the hands of all persons having more than 50 lb. in their possession. An allocation program is in effect.

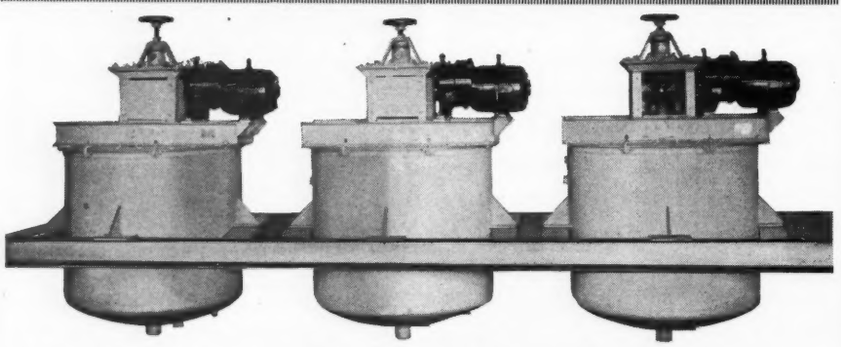
Rationing of retreaded and recapped tires began February 19, and absent from the list of eligibles were users of trucks for house-to-house delivery.

A 30-day extension on the cellophane limitation order (L-20) was ordered on February 16.

Wide World

LETTUCE QUEEN

As a stunt to promote Florida's winter crop of Iceberg lettuce, Phoebe Allen, Florida's 1942 lettuce queen, poses for the photographer at Clewiston, Fla.



Mixing Hot Stuff?

Bringing materials together while maintaining proper temperatures often eliminates a processing operation requiring additional machinery. For this job you will find the Robinson Vertical Liquid Mixer, with full steam jacket, ideal equipment for speeding production and lowering costs.

The agitator is of the double action type with the shaft revolving in one direction, while the outside yoke agitator revolves in the opposite direction. Both are driven from one pinion by a geared-head motor. Mixture is discharged through the bottom valve which is operated by a conveniently located hand wheel.

Made in twelve sizes of any metal specified.

Write us today for Bulletin 32-E.

ROBINSON MFG. COMPANY

71 PAINTER STREET MUNCY, PA.

OPA Sets New Price Ceilings for Foods

SINCE the last issue of FOOD INDUSTRIES, the Office of Price Administration has issued a number of orders affecting foods and food products.

Price Schedule No. 101 established maximum prices for citric acid both for producers and primary jobbers and for resellers at levels that have prevailed since 1939 for the most part. Price Schedule 91 sets the maximum price of tea at the October 1-15, 1941, level. Ceilings on prices of soybean and peanut oils based on levels prevailing October 1, 1941, were established in Price Schedule No. 92.

Mounting prices for vitamin C (ascorbic acid) brought an OPA price ceiling at the level prevailing on February 16. Sharp rises in cocoa and cocoa butter prices, in spite of record stocks of cocoa beans, were blocked by an OPA ceiling slightly lower than the December 11 level. Futures also were restricted.

Amendment No. 1 to Pepper Price Schedule No. 52 set new maximum prices for both black and white spot pepper, ex-dock New York. Fats and Oils Price Schedule No. 53 was again revised in Amendment No. 2. Besides the price revisions for lard, the original schedule and amendments on methods of arriving at maximum prices for fats and oils were amplified.

Flour 35 to 40% Enriched

FLOUR used by consumer households is today 35 to 40 percent enriched, and varies in this percentage in different parts of the country, according to a report given recently to the Midwest Section of American Association of Cereal Chemists.

SCHEDULE OF EVENTS

MARCH

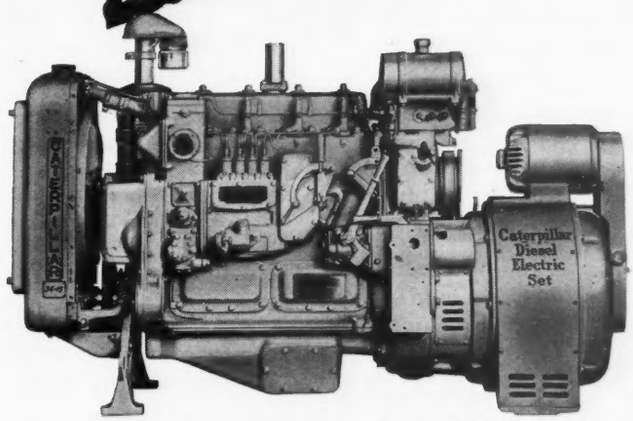
5–7—National Dairy Council, annual winter conference, Book-Cadillac Hotel, Detroit, Mich.
5–7—Canners League of California, Hotel Del Monte, Del Monte, Calif.
9–12—American Society of Bakery Engineers, nineteenth annual meeting, Edgewater Beach Hotel, Chicago, Ill.
10–12—Dairy Manufacturers Annual Conference, University of Wisconsin, Madison, Wis.
18–20—Wisconsin Canners and Field Men's School, University of Wisconsin, Madison, Wis.
30–April 10—Siebel Institute of Technology, 68th cake course, Chicago, Ill.

APRIL

14–16—Pacific Northwest Bakers Association, Multnomah Hotel, Portland, Ore.
14–17—Packaging Exposition, twelfth annual meeting, Hotel Astor, New York, N. Y.
20–24—American Chemical Society, Memphis, Tenn.

FREE AND INDEPENDENT WITH OWN-MADE

"1c ELECTRICITY"



"Caterpillar" Diesel Electric Sets are completely self-contained and self-regulating. Easy to install. No switchboard, voltage regulator or other external control apparatus needed. Sizes 15-90 kw.

THERE are no "demand charges" or "peak load" rates to haunt the management of Brooks & Sprague, Inc., in the operation of their "Lobster Aquarium" at Lynn, Mass. . . . A "Caterpillar" Diesel 34-15 Electric Set (model shown here) provides all the power they need for refrigeration, lighting, water circulating and sawmill (for barrels) in the handling of approximately 2,000,000 lbs. of live lobster and other seafood annually. . . . All at a *saving of about one-third the cost of the power formerly used!*

"Caterpillar" Diesel electricity is economical beyond the "small business" operator's dreams of a few years ago. And no wonder! . . . These simple, compact power-plants burn even such extra-cheap fuel as No. 3 domestic burner oil; burn it cleanly and completely—without waste.

Maintenance and depreciation are similarly low—due to rugged construction, precision manufacture, "Hi-Electro" hardened crankshaft journals and cylinder liners, positive-protection fuel and oil filters, and other long-life features. In fact, a total operating cost of 1c or less per kw.-hour is the rule rather than the exception among the hundreds of "Caterpillar" Diesel owners.

If your electricity is now costing you 2c or more per kw.-hour and your monthly bills are running $50 or over, a "Caterpillar" Diesel Electric Set can do a money-saving job for you too.

Write us for further information. Tell us something about your kind of business, plant set-up, power requirements, and present power type and cost . . . and we'll gladly estimate the savings possible with a "Caterpillar" Diesel. Or see your "Caterpillar" dealer.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

★ ★ ★

FOR VICTORY—*Our armed forces have first call on "Caterpillar" production. We thank customers who have suffered delivery delays by giving clear right-of-way to our Victory efforts.*

CATERPILLAR DIESEL
REG. U.S. PAT. OFF.
ELECTRIC SETS

Keep Tryin' - Keep Smilin'
Remember
JOB NO. 1 IS TO
WIN THE WAR

★ ★ ★

Guns, planes, ships, tanks, food and supplies come FIRST as Uncle Sam's forces fight to victory.

That's why Viking production today is devoted largely to War demands. Every day scores of Viking Rotary Pumps are rushed to completion and shipped out to help with vital War production work from coast to coast. That's why, much as we regret it, sometimes we are unable to give usual prompt Viking service on orders received from valued customers in non-defense industries.

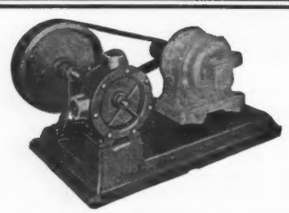


Figure 53—Viking's standard V-belt driven unit. Capacities 5 to 1050 GPM. Dependable and flexible in operation.

To help you get utmost delivery from your present pumps, the Viking Service Manual explains and illustrates correct installation . . . how pumping efficiency may be stepped up . . . how some repairs and replacements may be avoided. It's free. Write for your copy today.

★ ★ ★

VIKING PUMP CO.
CEDAR FALLS, IOWA

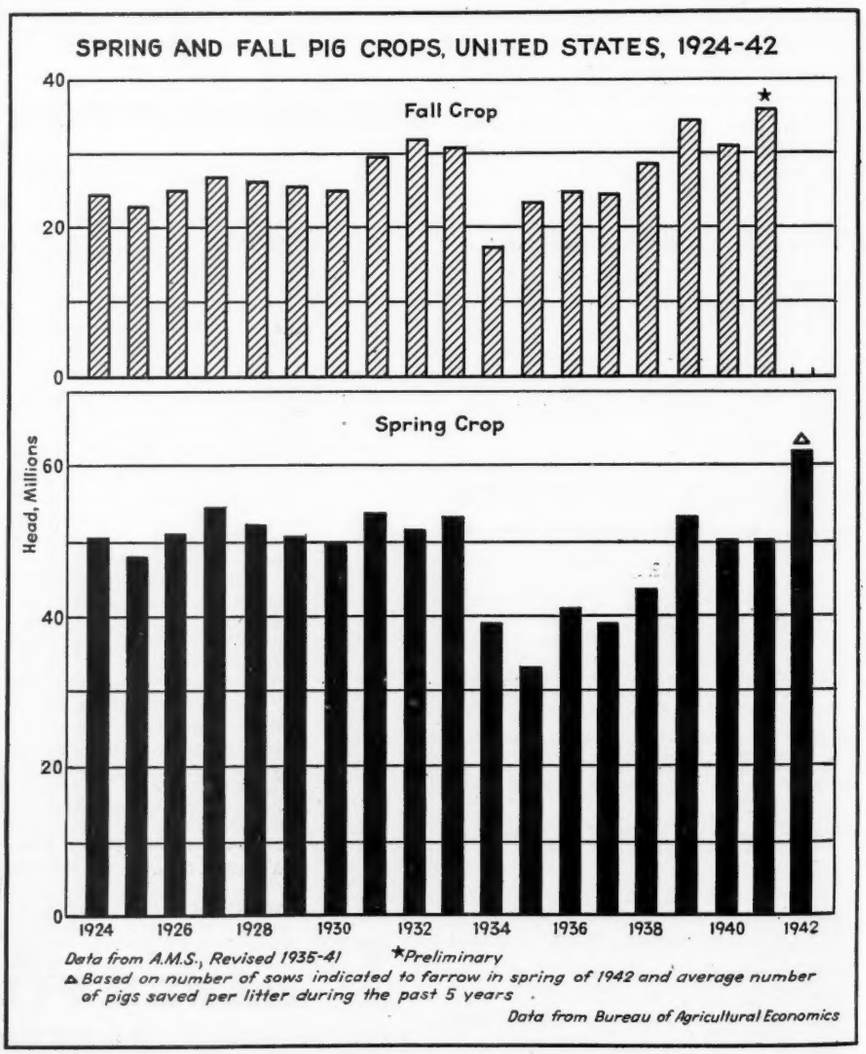
CAPITAL VIEWS

CONVERSION—The conversion of American manufacturing industry must be accomplished quickly. For metalworking plants this means shifting manufacture to make something definitely a part of war equipment. For other plants it means taking on war jobs, even when radical changes are necessary. For food plants it is likely to mean, before long, shifting from normal manufacture to the making of things necessary for wartime food supply. Fancy items and frills will gradually disappear as the full force of American business gets behind the one job of war manufacture. It sounds very disturbing. It will be.

COCONUT OIL—Use of coconut oil for foods was almost completely prohibited by the first fat and oil restrictive action of WPB. However, it has been recognized officially that there may be some uses other than soap manufacture which are essential, even in wartime. Allocation for those special uses will be made after persuasive argument only. It will not be enough to argue that "we cannot make a first-quality product without coconut oil." Lots of folks will not be allowed to make first-quality products from now on. The restrictions on coconut oil are only a first step toward control of fats and oils for which shortage is now anticipated.

GOVERNMENT BUYING—Government purchases will take from 15 to 40 percent of the total canned foods produced in the United States, important officials have estimated. The percentage varies according to the fruit or vegetable. And these percentages may be very much increased as restrictions on cans take effect. Government buying of food for Lease-Lend purposes alone will represent a billion dollars or more for this year. That does not include purchases for Army, Navy or other government agencies. Thus, every division of food manufacture is likely to suffer serious depletion of stocks.

TIRES OR SUGAR—The decision as to how much edible molasses should be used for industrial alcohol was a difficult one to make. The alcohol needs for synthetic rubber making were potentially huge. It would have taken a million tons of sugar fully to meet them. That would have taken a very large percentage away from the Ameri-



can housewife. But tires are so vital in civilian life, as for the military, that the government must, for this year at least, use substantial quantities of edible molasses in this way. The large quantity to be used is far less than might have been so allocated. It is hoped that next year there will be a great increase in the making of rubber chemicals from petroleum, thus accomplishing all further expansions by use of that raw material, instead of sugar.

IMPORT COMPETITION—The available shipping space to bring commodities to the United States is severely limited by present warfare conditions. The food industries must, therefore, worry as to whether they can get needed cocoa, sugar, oil seeds and other urgently wanted raw materials. It is no longer worth worrying as to whether excessive quantities of competitive food materials will be imported. There is no ship space for that.

WAR QUOTAS—American food factories will probably not be hit anything like as severely by raw material quotas as were British firms. In England, nonessential firms get no raw materials. Important firms get 25 to 33 percent of peacetime quotas. Most urgent civilian needs will get only 50 percent of peacetime quotas. Only direct military requirements or absolutely essential foods are expected to run more than 50 percent of peacetime. These figures give a picture of the drastic policy that "war business comes first," which is developing in Washington also.

INCENDIARY FIRES—Any firm fearing fire damage from incendiary bombs of magnesium can get up-to-date instructions regarding handling of such bombing threat in a report of the U. S. Bureau of Mines. Possibility of even "token" raids may dictate to management that it inform itself regarding this peculiar sort of fire-fighting job which may possibly have to be done somewhere sometime in the United States.

GOALS FOR FARMERS—Huge production by agriculture is planned without any acreage restraints except for cotton and wheat. Washington now even worries about the adequacy of the corn crop because of the huge feed demand anticipated. The impact of this on food manufacturers will be tremendous. Every plant which can be utilized to put agricultural products into keepable form will be expected to take part promptly in that job.

Canned Fish Likely To Be Scarce

LEASE-LEND requirements for canned fish from the 1942 pack have been set at 100,000 long tons. Combined with American military requirements and the uncertainties of 1942 production, this situation forecasts a major curtailment of available domestic supplies from the 1942 pack.

Most of the Lease-Lend supply will be made up of sardines and salmon, and the

UNCLE SAM *comes first*

Of course, there's nothing that can stop Vilter's all-out cooperation in helping produce the necessary sinews of war. For our American Freedoms must be preserved and the fighting Democracies saved from imminent enslavement — by the only "language" that ruthless Dictatorships are capable of understanding.

The life long engineering skill and craftsmanship so long associated with Vilter is, right now, being put to use. Our production lines, too, "REMEMBER PEARL HARBOR." All Vilter men realize battle fronts are only as successful as the cooperation they receive in supplies and weapons from the "home front." . . .

"Uncle Sam" comes first in our consecrated thought and effort. But, while we are busy on necessary wartime production, we are doing our best to take care of essential civilian requirements in Refrigeration. Our many friends in the Food Processing Industries know our capacity and capacities. They call upon us daily for any essential service, new equipment or replacements. Those of you who have not bought Vilter Superior Equipment, will do well to investigate this reliable service now. The health of American Civilians is a necessary part of our National Strength, and Refrigeration is an essential to help preserve that health and vigor. This means a "Double Defense Duty" for Vilter — a responsibility that we enjoy demonstrating to the benefit of Army, Navy, and Civilian "Defenders" alike.

THE VILTER MFG. COMPANY
2115 South First Street
Milwaukee, Wisconsin

Superior Since 1867
VILTER
Air Conditioning
Refrigeration . . .

"Double Eddy" says:

The buyer wanted to know how much dust this collector would recover

★ Symbolizing the harnessed power of the double eddy current—an exclusive advantage of the Buell (van Tongeren) Dust Recovery System.

Installation of Buell Collectors in plant of nationally-known food products manufacturer.

BUELL GAVE THE MOST ACCURATE GUARANTEE KNOWN

Buell's "fractional efficiency" guarantees are famous for their accuracy. Briefly, they are guarantees to collect a definite percentage of the dust particles of each size—a guarantee that holds regardless of the inevitable and continual changes in particle size distribution that make it impossible ever to give an unqualified overall efficiency guarantee. Buell's guarantees are conservative and actual performance usually betters the guarantee.

For a typical installation, here are guarantees and actual performance:

Particle* Size in Microns	Guaranteed to Collect	Actual Collection
0 to 10	61%	63.2%
10 to 20	92%	92.6%
20 to 30	98%	98.5%
30 to 43	99%	99.4%
plus 43	99.5%	99.8%

*Specific Gravity—2.0

May we send you a copy of our special bulletin *"Fractional vs. Overall Efficiency Guarantees"?* Simply request it on your letterhead.

BUELL'S 6 PLUSES

Buell (van Tongeren) Dust Recovery Systems offer every user these six plus advantages . . .

- + *High Recovery Efficiency*
- + *Low First Cost*
- + *Low Maintenance*
- + *Unlimited Capacity*
- + *Long Life*
- + *Fractional Efficiency Performance Guarantees*

. . . all good reasons why so many of America's leading industrial concerns prefer Buell.

BUELL ENGINEERING CO., Inc.
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Nation-wide service through offices of either Buell Engineering Co. or B. F. Sturtevant Co.

CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

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CONSTRUCTION NEWS

	Pending (thousands)	Awarded February (thousands)	Total Awarded 1942 (thousands)
Bakery	$110	.....	.....
Beverages	322	$220	$582
Canning and Preserving	.....	40	40
Cold Storage Plants	45	.....	175
Confectionery	.....	.....	.....
Grain Mill Products	2,800	.....	60
Ice Manufactured	.....	40	40
Meats and Meat-Products	40	.....	83
Milk Products	180	270	528
Miscellaneous	440	650	1,205
	$3,937	$1,220	$2,713

pack of these is mostly produced on the Pacific Coast. What it will amount to will in good part depend on the naval situation in the Pacific during the fishing season.

Surplus Marketing Administration, official buyer of Lease-Lend foods, took roughly 3,000,000 cases of sardines and 1,500,000 cases of salmon from the 1941 packs. This year, however, SMA will take its requirements in whatever varieties are available, with the least disturbance to the domestic market.

The War Production Board, anticipating difficulties ahead, has asked the salmon canners not to quote prices for 1942 pack until SMA and military requirements can be determined more definitely and estimates of supplies become more clear.

Controls Stabilize Commodity Prices

CEILINGS, limitation, restrictions and other government controls growing out of war necessities have, at least for the time being, flattened out most of the fluctuations in commodity prices. The *N. Y. Journal of Commerce's* weekly index of prices, at 100 on January 10, was 100.4 on February 14, 1942. The same publication's index of grain prices, at 95.7 on January 10th, had fallen to 95.4 by February 10, while the food index fell from 99 to 98.4 in the same period.

So much of the economy is now under strict control that normal changes in spot commodity prices have also tended to disappear. Wheat, No. 2 hard winter, Kansas City, at $1.24¼ on January 12, fell to $1.19¾ by February 10. Corn, No. 3 yellow, Chicago, fell from 82¼c. to 80½c. in the same weeks. Among the meats, beef decreased from 20½c. to 19½c., lamb fell from 21c. to 18½c. and pork loins were steady at 22½c. for the period. Lard increased sharply from $11.20 to $12.35. Eggs fell from 34c. to 30½c., while butter also decreased, from 35¾c. to 34¾c. Cheese

was unchanged at 26¼c. Sugar and coffee were also unchanged, but cocoa fell from $9.45 to $8.90. Among the canned foods the only important change was in tomatoes, which increased from 95c. to $1.00 per dozen for No. 2 Maryland.

More Eggs in View

ALTHOUGH the 1942 goal for egg production has been again increased, this time to 13 percent over 1941 output, there is every probability that the higher quantity will be produced. Potential layers in flocks on January 1, 1942, were 8 percent greater than on January 1, 1941, and there is good prospect that this margin will be increased during the year.

Laying flocks are composed of a somewhat larger proportion of pullets this year than last, which should assure a continued high output per layer. Egg production in December, 1941, was 15 percent over production a year before and the rate of lay per hen on January 1, 1942, was 9 percent larger than on January 1, 1941. Prices received by farmers for eggs this year will undoubtedly average higher than last year. Another factor making for greater production is the favorable egg-feed ratio, which continues in spite of higher feed prices.

INDICATORS

Hog slaughter, federally inspected, in 1942 is expected by the Bureau of Agricultural Economics to total about 54 million head, the largest on record and comparing to 46,500,000 head in 1941.

Meat production, all kinds, in 1942, is expected by the Bureau of Agricultural Economics to reach 21 billion pounds, 8 percent above 1941 figures and the largest on record.

Flour production in January, 1942, by mills accounting for 65 percent of U. S. output, reached 6,173,829 bbl., according to *The Northwestern Miller*. Output by the same mills in January, 1941, was 5,693,639 barrels.

Flour production in 1941, according to the Bureau of the Census, totaled 105,992,210 bbl. of wheat flour, 2.9 percent over the 1940 output.

Truck crop acreage this season in the winter producing areas is reported by Agricultural Marketing Service to have been 310,550 acres, compared to 274,670 acres a year before. Prospective production for fall, winter and early spring truck crops is set at 20 percent in excess of last year.

Canned vegetable goals set for 1942 (basis of 24 No. 2 cans to a case) are 156.8 million cases, compared to 142.1 million cases last year, the increase being confined almost entirely to peas and tomatoes.

Poultry, all kinds, in frozen storage on February 1, 1942, totaled 204,601,000 lb., compared to 191,410,000 lb. on February 1, 1941, and to an average of 157,062,000 lb. for February 1 in 1937–1941.

Meat, all kinds, in cure and frozen storage on February 1 of this year amounted to 871,897,000 lb. A year previous the total was 951,531,000 lb. and the average for February 1 in 1937–1941 was 829,115,000.

Lard in storage, February 1, 1942, was 201,011,000 lb. and rendered pork fat on the same date totaled 4,959,000 lb. On February 1, 1941, the combined figures for these products totaled 306,890,000 lb. and the average for the date in 1937–1941 was 184,634,000 pounds.

Weekly wholesale food price index of Dun and Bradstreet, at $3.53 in mid-February, compared to $2.54 a year before and stood at the highest level in many years.

Business activity index of *Business Week*, at 171.0 on February 7, 1942, compared to 146.4 a year before and was at the highest point ever recorded.

Cost of living index of National Industrial Conference Board was at 94.5 in January, 1942, compared to 93.2 in December, 1941, and to 86.0 in January, 1940.

Fishery products in cold storage on January 15, 1942, totaled 97,246,818 lb., compared to 86,879,773 lb. a year earlier.

Tomato juice pack in 1941 is now reported by National Canners Association to have been 23,390,935 standard cases, compared to a 1940 pack of 15,179,055 standard cases.

Butter, creamery, produced in December, 1941, was estimated by the U. S. Department of Agriculture at 117,865,000 lb., 6.9 percent below December, 1940, and the lowest December output since 1937.

Butter, creamery, produced in 1941, is estimated at 1,900,575,000 lb., 3.5 percent above 1940 output and 12.7 percent above the 1930–1939 average.

Cheese, American, produced in December, 1941, is estimated at 52,945,000 lb., up 50.6 percent from December, 1940, and 112.7 percent over the 1930–1939 average.

Confectionery and competitive chocolate products sales in December, 1941, were reported by the Department of Commerce at $32,194,000 for the 191 firms reporting, up 26 percent from December, 1940. Sales for the same firms in the year 1941 totaled $284,397,000, up 20 percent over 1940 sales.

Cheese, American, produced in 1941 is estimated at 723,550,000 lb., an increase of 20.3 percent over 1940 production and 60.3 percent above the 1930–1939 average.

Oleomargarine sales in December, 1941, as indicated by sales of internal revenue stamps, totaled 33,481,746 lb., up 19.4 percent above sales in December, 1940. For the year, sales totaled 370,075,054 lb., 16.4 percent above sales in the preceding year.

Egg production in 1941 was over 40 billion eggs, 5 percent above 1940 output and 4 percent over 1930, the previous record year. Rate of lay per hen was 5 percent over 1940 and 3 percent over 1938, the previous record year.

Milk, fluid, sold in December, 1941, was reported by Milk Industry Foundation to be 4.6 percent higher than in December, 1940, while the full year 1941 showed about 5 percent increase over 1940.

Evaporated milk production in December, 1941, at 286,899,000 lb., was 93 percent over December, 1940, and 150 percent over the December 1935–1939 average.

Evaporated milk production in 1941 is estimated at 3,165,906,000 lb., 28 percent greater than in 1940 and 57 percent above the 1935–1939 average.

Eggs, liquid, packed in December, 1941, totaled 12,062,000 lb., up 2,660 percent above the 437,000 lb. packed in December, 1941.

Eggs, dried, whole, produced in December, 1941, totaled 4,860,230 lb. None of this product was made in December, 1940.

Milk production in 1941 was the highest on record and about 5 percent larger than in 1940.

Fruits, frozen, in storage on February 1, 1942, totaled 154,389,000 lb., compared to 128,271,000 lb. on February 1, 1940, and to 108,924,000 lb. as a 1937–1941 February 1 average.

Vegetables, frozen, in storage on February 1, 1942, were 79,619,000 lb., compared to 70,919,000 lb. a year previous.

Butter, creamery, in storage on February 1 this year was 83,205,000 lb., compared to 29,715,000 lb. a year before and to an average in 1937–1941 of 48,841,000 lb. for the date.

Cheese, all kinds, in storage February 1, 1942, totaled 161,685,000 lb., compared to 125,308,000 lb. a year before and to a February 1 average of 104,424,000 lb. in 1937–1941.

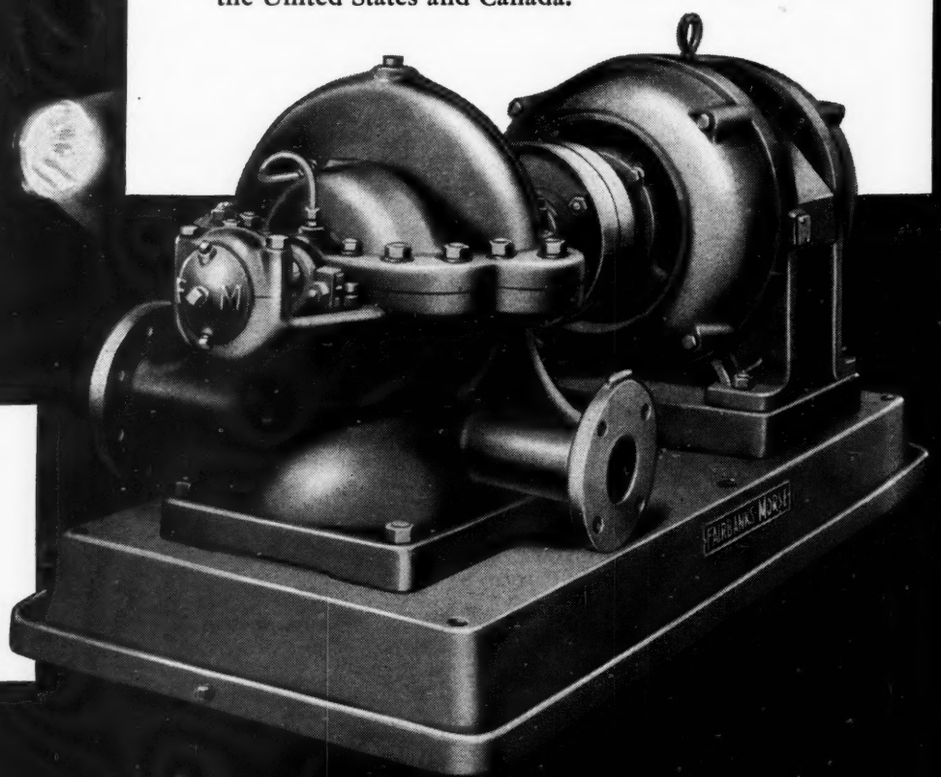
Eggs, case equivalent, in storage on February 1 of this year amounted to 2,313,000 cases. A year before the total was 1,732,000 cases, while the average in 1937–1941 for the date was 1,829,000 cases.

Guards Are Futile Against THIS Sabotage !

RIGHT under your guards' noses, unsuspected saboteurs may be steadily draining off vitally needed power... handicapping production as much as would destroying one generator out of every four or five!

These unsuspected saboteurs *are* at work in your plant if your pumps are not of the latest, improved designs. For ten-year-old pumps of certain types, even if as good as new, require 25% more power than today's Fairbanks-Morse models. And 4- or 5-year-old pumps of other types consume so much more power than current models that continued use is more costly than replacement.

Find out *now* if *your* pumps are the types which curtail production and steal power and profits. Let a Fairbanks-Morse Pump Engineer make an inspection, with no cost or obligation to you. Write Fairbanks, Morse & Co., Dept. C209, 600 S. Michigan Ave., Chicago. Branches and service stations throughout the United States and Canada.



FAIRBANKS-MORSE CENTRIFUGAL PUMPS

A complete "family" of single-stage, split-case pumps for low, moderate, medium, and high heads, is described in Bulletin 5810D. Many other bulletins available on other types.

FAIRBANKS·MORSE PUMPS

DIESEL ENGINES ELECTRICAL MACHINERY MAGNETOS RAILROAD EQUIPMENT WASHERS-IRONERS STOKERS
PUMPS MOTORS FAIRBANKS SCALES WATER SYSTEMS FARM EQUIPMENT AIR CONDITIONERS

MEN · JOBS · COMPANIES

INDUSTRY

Armour & Co. opened its new canning plant at Omaha, Neb., on Feb. 9, with E. G. Hinton as manager. The plant, a four-story structure, will produce more than 1,000,000 lb. a year, and all of the meat canned will be turned over to the government.

Borden Co., New York, has awarded $1,000 to assist the work done by Irvington House, Irvington-on-the-Hudson, N. Y., in the study and treatment of rheumatic fever.

Colonial Molasses Co. is moving its plant from Brooklyn, N. Y., to Jersey City, N. J., to make way for the expanding Brooklyn Navy Yard. The new Colonial plant is a modern concrete building with windows on all sides.

Fairmont Creamery Co., Omaha, Neb., will establish two large egg-drying plants at Crete, Neb., and Moorhead, Minn., using more than 200,000,000 eggs a year to be sent to Britain under the Lease-Lend program. Milk drying equipment will also be installed.

Falstaff Brewing Co., Omaha, Neb., is spending $180,000 on new construction and equipment, including a $60,000 addition, 62 vats, each with a capacity of 1,000 gal., a yeast room and two new ice machines.

Grand Valley Brewing Co., Ionia, Mich., is completing construction of an addition which will increase floor space of the plant by 6,000 ft. The 30x112-ft. addition includes a basement and ground-level storage room as well as a new loading dock, connected with other buildings by a conveyor system.

CLAUDE F. DAVIS

Schwarz Laboratories, Inc., food technologists and analysts, New York, has announced that Claude F. Davis has been appointed chief chemist of the staff. Mr. Davis has been associated with Noblesville (Ind.) Milling Co. and Michigan Bakeries, Grand Rapids, Mich. He was 1940-1941 president of American Association of Cereal Chemists.

HAROLD G. CUTRIGHT

JOHN W. LUCE

Standard Brands, Inc., has elected to the Board of Directors Harold G. Cutright, vice-president in charge of finance, and John W. Luce, vice-president in charge of manufacturing. Mr. Cutright comes to the company from Minneapolis-Honeywell Regulator Co. Mr. Luce has been in charge of production for Standard Brands since 1929.

Lakeshire-Marty Cheese Co., Monroe, Wis., has opened an experimental factory at Blanchardville, Wis., near Monroe, for the purpose of determining what kind of foreign-type cheese, formerly imported, can be made there profitably.

Land O'Lakes Creameries, Inc., will build a $300,000 two-story milk dehydration plant in Whitehall, Wis.

David L. Moss & Co., New York, is expanding its egg drying facilities with the opening of a new plant in Chicago.

National Sugar Refining Co. has acquired Pennsylvania Sugar Co., which will be operated as a wholly owned subsidiary. Charles B. Castle, assistant vice-president, will coordinate production and distribution.

P. J. Ritter Co. is enlarging its recently purchased cannery building at Johnston, S. C., and installing new equipment to pack asparagus, fruits and vegetables. The cannery will have an output of 200,000 cans a day. Bailey Ritch is manager.

Southwestern Sugar and Molasses Co. has moved its main office from Corpus Christi to Texas City, Tex., where it has facilities for distributing molasses from Mexico and Cuba.

Stokely Bros. & Co., Inc., is building a food canning and processing plant in Houston, Tex., costing $100,000 with equipment.

Sunshine Biscuit Co. will rebuild its plant and distributing center in Sacramento, Calif. Cost of the new unit is estimated at $50,000.

Vita Food Products, Inc., New York, has donated $400 to Russian War Relief, Inc. The money will be used for the purchase of medical supplies and surgical instruments to be shipped to Russia.

Waunakee (Wis.) Canning Co. is constructing a one-story steel and tile plant addition, 100x200 ft., costing more than $50,000 with equipment.

Wesson Oil and Snowdrift Co., Inc., has awarded contract for construction of a three-story food processing plant in New Orleans, La., to cost $225,000 with equipment.

PERSONNEL

Harry R. Beard, who at one time organized the Canadian Fishing Co., Ltd., research and science department at Vancouver, B. C., has left the company to establish a science and research department for New England Fish Co. at Seattle, Wash.

Lloyd Burtenshaw, formerly with Frozen Food Lockers, Inc., will be manager of a new $300,000 refrigerator plant of 500 lockers now under construction in Sparta, Mich.

W. L. Campbell, formerly vice-president and director of Kroger Grocery and Baking Co., Cincinnati, has joined American Ma-

chine & Foundry Co., New York, in an executive capacity.

Charles A. Coffey, formerly with the Armour Research Foundation of the Illinois Institute of Technology, has joined the Swift & Co. research organization.

Harry Cunningham, formerly with Skinner and Eddy Corp., Seattle, Wash., has joined G. P. Halferty & Co., Seattle, in an executive capacity.

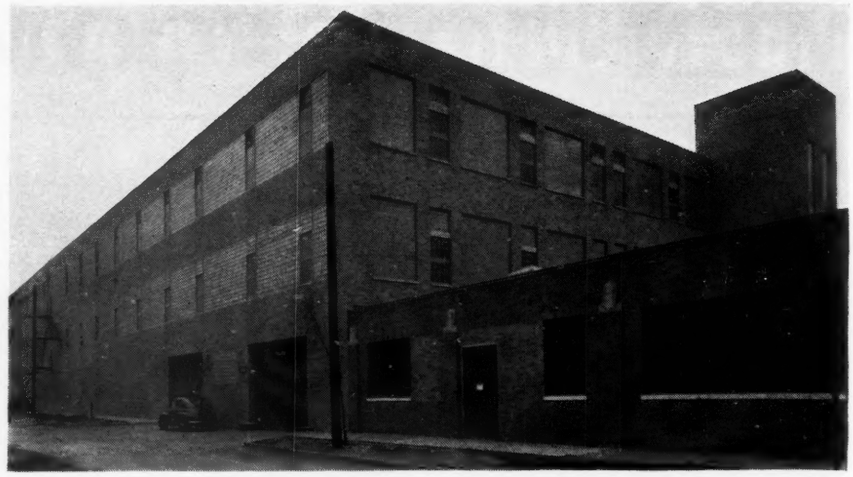
R. R. Deupree, president of Procter & Gamble Co., Cincinnati, Ohio, was elected chairman of the Business Advisory Council of the Department of Commerce at Washington, D. C.

R. J. Dinning, former chairman of the Alberta Liquor Control Board, has been named director and vice-president of Burns & Co. Ltd., Calgary, one of Canada's leading meat packers.

A. W. Dutcher, formerly associated with the C. H. Musselman Co., Biglerville, Pa., has joined the field research department of National Can Co., Inc., Baltimore, Md.

William B. Freihofer, formerly general manager of Freihofer Baking Co., Indianapolis, has been appointed executive and technical assistant to the Quartermaster General, U. S. Army, in the Supply Division.

Frederick Fritsche and Harold C. Perkins have been elected vice-presidents of Horn & Hardart Baking Co., Philadelphia.



OWENS-ILLINOIS PLANT IS COMPLETED

The new modern three-story plant of Owens-Illinois Can Co., in Clearing, Ill., adds 176,000 sq. ft. of floor space to the company's facilities. Light-conditioned, sound-conditioned and fire proof, the building makes profuse use of glass blocks in the outer walls, which flood the interior with sunlight. The plant, of steel framework with reinforced concrete floors, provides for a gravity flow of work. It will service the Midwest from Minnesota to the Gulf.

Dr. Z. I. Kertesz is on leave of absence from the New York State Agricultural Experiment Station, Geneva, N. Y., to work with Citrus Concentrates, Inc., Dunedin, Fla., on the production of pectin from orange peel, to fill orders from SMA under Lease-Lend arrangement.

Hal Neubauer has been appointed general manager of the Christian Feigenspan Brewing Co. of Massachusetts, Boston, Mass., succeeding William A. MacKenzie, resigned.

Herbert Taylor, Northwest Yeast Co., is chairman of the Food Section of the Food Safety Division of National Safety Council.

G. R. Williams has been elected chairman of the board of American Bakers Foundation. Vice-chairman is Joseph A. Lee; vice-president is M. Lee Marshall. Tom Smith continues as secretary.

J. Graham Wright is 1942 president of Tea Association of the United States of America. Vice-president is Charles J. Hensley.

Ralph Young, former superintendent of the Columbus, Wis., plant of Columbus Foods Corp., has joined Lee Dingee, Inc., Lindale, Tex., as general manager of production.

DEATHS

Ralph E. Bailey, 58, president, of Bailey Fish Co., Omaha, Neb., recently in Omaha.

Arthur T. Danahy, president-treasurer of Danahy Packing Co., Buffalo, N. Y., Feb. 1, in Buffalo.

Francis Carroll Gilligan, 53, assistant superintendent of Franklin Sugar Refining Co., Philadelphia, Pa., Feb. 5, in Camden, N. J.

Robert J. Griesedieck, president of Griesedieck Bros. Brewing Co., St. Louis, died Jan. 20 from injuries received in an automobile accident.

EXPERIENCE COUNTS—*ALWAYS!*

You can't buy EXPERIENCE, but *JAMISON* builds it into EVERY DOOR

Our 50 years' experience produces cold storage doors which efficiently protect the contents of your refrigerated rooms.

JAMISON-BUILT DOORS—always essential to the best protection of your perishable food products—are today a vital link in national defense. For NO FOOD MUST BE WASTED. Why be satisfied with anything less than the best—at no extra cost? Get JAMISON-BUILT DOORS.

A typical example of how Jamison creates doors to meet all needs

Consult nearest branch or address

JAMISON COLD STORAGE DOOR CO.

Jamison, Stevenson and Victor Doors

HAGERSTOWN, MARYLAND

JAMISON-BUILT COLD STORAGE DOORS

Thomas M. Hooper, 57, former plant manager for Post Products Division, General Foods Corp., Feb. 3, in Battle Creek, Mich.

Ray O. Kirn, 58, former chief engineer for Quaker Oats Co., Chicago, recently in Chicago.

Franklin Kronenberg, 78, pioneer New England ice cream manufacturer and former head of Neapolitan Ice Cream Co., Cambridge, Mass., Jan. 27, in Cambridge.

Professor Merrill J. Mack, 39, Massachusetts State College dairy industry expert, Feb. 9, in Amherst, Mass., following an operation.

Rudolph Wittmann, 77, for 30 years secretary-treasurer of the Cream City Brewing Co., Milwaukee, Wis., Feb. 5, in Milwaukee.

ASSOCIATED INDUSTRIES

Brown Co., New York, pulp and paper manufacturing concern, announces that Harry E. Houghton, general sales manager, has been appointed Merchandising Consultant to the Office of Paul V. McNutt, Federal Security Administrator.

Economic Machinery Co., Worcester, Mass., has appointed Sidney T. Carter as chief engineer. Mr. Carter was formerly with Schenley Distilleries, Inc.

Frick Co., Waynesboro, Pa., has reported the death of Ezra Frick, 86, president of the company and a pioneer in the refrigeration industry.

Kold Hold Manufacturing Co., Lansing, Mich., is rushing an addition to its new plant in that city, to meet a greatly expanded production schedule for 1942. This new expansion increases the floor productive area by 100 percent.

Monsanto Chemical Co. has completed construction of the Chemical Warfare Service's St. Louis Plant No. 1, Monsanto, Ill., and has turned it over to the Army on time and at a cost less than that estimated.

Package Machinery Co., Springfield, Mass., has elected George A. Mohlman as president, succeeding Roger L. Putnam, chairman of the board.

Owens-Illinois Can Co., Toledo, Ohio, has announced the appointment of Dr. C. O. Ball as technical director. Dr. Ball was formerly with the research staff of National Canners Association, and assistant director of research, American Can Co.

Seamless Steel Tube Institute, Pittsburgh, Pa., has announced the establishment of a new service whereby purchasers may obtain information on the availability of various grades and sizes of seamless steel tubing.

Why more food plants are changing over to Oakite Cleaning

TENNESSEE EDIBLE OIL PACKER CLEANS EQUIPMENT EASIER

Today . . . with output of food products being greatly increased . . . maintaining QUALITY CONTROL comes FIRST! To safeguard product purity and wholesomeness, processing equipment must be kept sanitary. And more food plants are now doing this EASIER and FASTER by using Oakite pressure cleaning.

FOR EXAMPLE: A packer of vegetable oils and shortenings in Tennessee now cleans storage tanks, centrifugals, filter presses, deodorizing vats and filler machines in a MERE FRACTION of the time and effort previously required. Applied by the Oakite Steam Gun, a solution of the recommended Oakite cleaning material provides the TRIPLE combination of heat, mechanical force and detergent action that thoroughly, speedily removes oxidized oil and grease deposits.

Write for FREE Booklet Giving Complete Story!

Why not find out how this WORK-SAVING, time-saving method can HELP YOU, too, step-up sanitation efficiency . . . get BETTER cleaning for LESS MONEY? Interesting, illustrated, FREE booklet gives all the facts. There is no obligation whatsoever, so won't you write for YOUR copy today?

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Representatives in All Principal Cities of the United States and Canada

Nation-Wide Service In These Industries

OILS & FATS
DAIRY PRODUCTS
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SUGAR REFINING
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FROZEN FOODS

OAKITE (TESTED) **CLEANING**

MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

WAR

this too, shall pass away

Another good thought passed on by

KVP

"The World's Model Paper Mill"

MAKERS OF

PARCHMENT, BOND, WAXED, GREASEPROOF, HOUSEHOLD AND WRAPPING PAPERS

KALAMAZOO VEGETABLE PARCHMENT COMPANY

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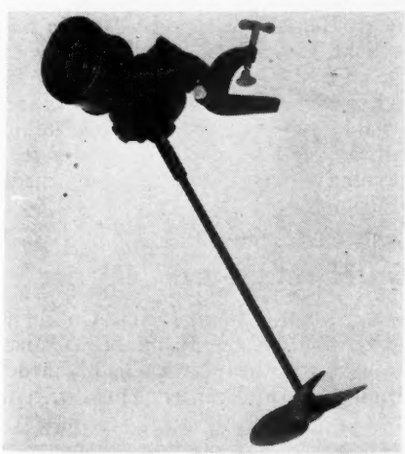
FOOD EQUIPMENT NEWS

Slow Speed Air-Powered Mixer

EASTERN ENGINEERING CO., 45 Fox St., New Haven, Conn., has added to its line of mixing equipment the Model A-2 air-powered mixer. In design, this is a special high torque, slow speed mixer, adapted for mixing heavy, viscous liquids. Its air motor has a variable speed, so that it can be used over a range of applications. It is completely inclosed, thus protecting the motor from splashing.

This mixer is rated at 1½ hp. with a maximum speed of 400 r.p.m. on 40 lb. of air pressure. Speed reduction is accomplished by reducing the air pressure. The propeller diameter is 12 inches.

The manufacturers state that this new mixer is particularly adaptable to the slow speed mixing of liquids containing particles such as crystals, diced fruit or other food products.

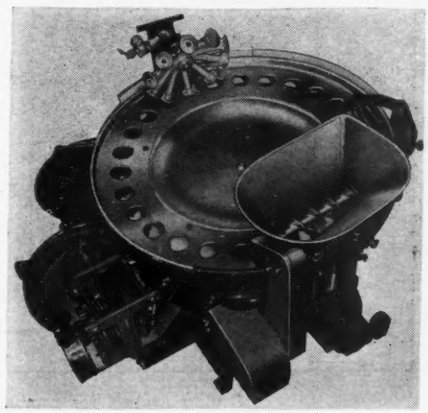


Slow speed air-powered mixer for heavy or viscous liquids.

Improved Hand Pack Filler

FOOD MACHINERY CORP., Hoopeston, Ill., has brought out various automatic attachments and accessories for its FMC hand pack filler. These include an automatic filling hopper which makes filling almost completely automatic at good speed; a rotary brushing attachment; a pack briner; and a vibrating can track. If desired, automatic juicing attachment and plain hopper can also be supplied.

The manufacturer states that these new attachments are of special interest to specialty canners and to those who have "tricky" filling jobs, but can also be used to good advantage by any plant doing a general line of canning. With them, it is possible to fill in a practically automatic manner such products as Julienne potatoes and other shoestring products; cut, sliced, dried or mixed vegetables; sliced fruit; macaroni; pickles; fish flakes; popcorn; coconut; olives; citron peel; oven-baked beans; and similar foods.



New attachments improve hand pack can filler.

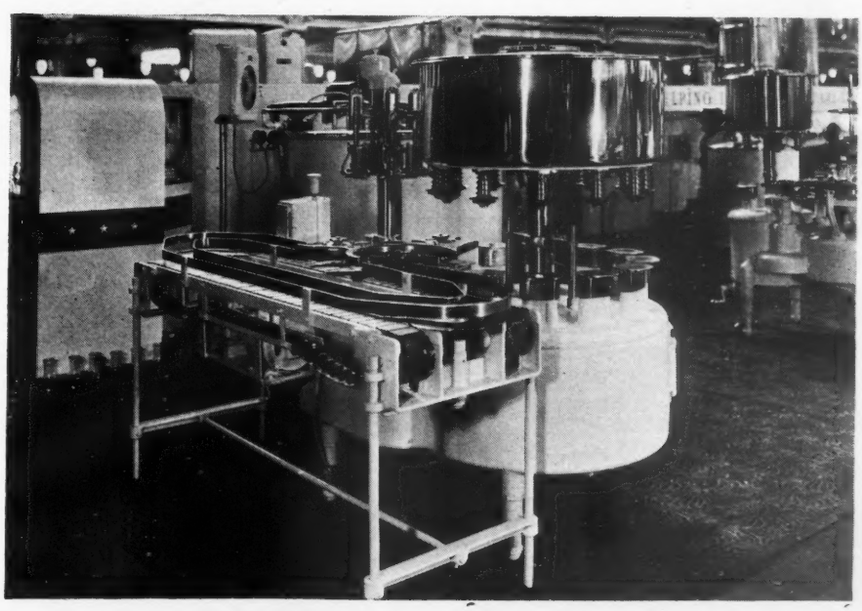
It is stated that this hand pack filling equipment offers several unusual operating features: Cans are fed continually and placed automatically in accurate register with the filling opening. The entire carrying table revolves, as well as the center bowl carrying the product to be filled. Can and filling openings are placed closely together and locked into position to give large capacity with small floor space.

Food Plant Paints

AMERICAN-MARIETTA CO., 43 E. Ohio St., Chicago, has brought out an interior paint said to be particularly adapted for use in plants where odors from paints might be absorbed by food. This plant, which is said to be deodorized before it is canned, is presented as making possible painting in winter when doors and windows are closed. The product is said to set in three hours and to be completely dry in 12 to 15 hours. It may be used on plaster, wallboard, wood, cement, brick or metal, and is available in flat, egg-shell and gloss. Designated "Valdura No-Odor," this product comes in white, cream, ivory, buff, gray, blue, and green.

Milk Bottle Filler and Capper

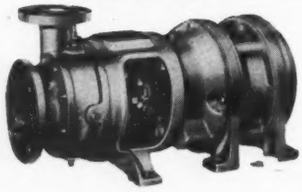
PFAUDLER CO., Rochester, N. Y., has recently developed a 12-station filler and capper for milk bottles. Features of this filler include a fully enclosed housing, direct connected operating gears for precision timing, no-drip valves to avoid slopping and waste, a four-head rotary capper, and quick raising and lowering mechanism for the filler bowl. The machine delivers 72 qt. of milk per minute and can be adjusted to handle sizes from ½ pt. to ½ gal.



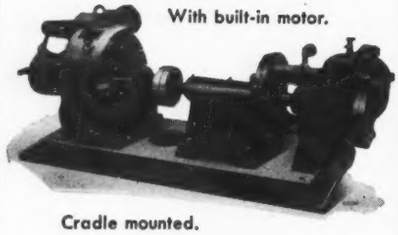
12-station automatic filler and capper for milk bottles.

THE PUMP YOU NEED—

When you Need it

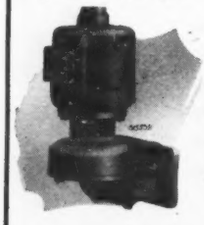


With built-in motor.



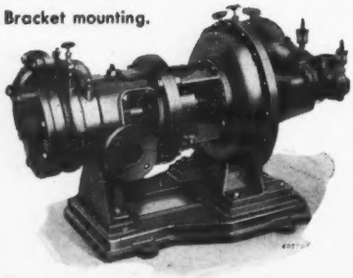
Cradle mounted.

When you want a pump in a hurry, Ingersoll-Rand can, in many cases, ship it to you from stock. Pumps shown on this page are available in capacities from 5 to 1500 gals. per min. for pressures from 5 to 215 lbs. per sq. in. Furthermore, they are quality pumps that you can depend on to give many years of trouble-free service. They are available with both open and closed impellers for handling almost any type of liquid. Let our engineers tell you more about them.



In addition to the pumps illustrated there are other I-R pumps for practically every pumping requirement.

Bracket mounting.

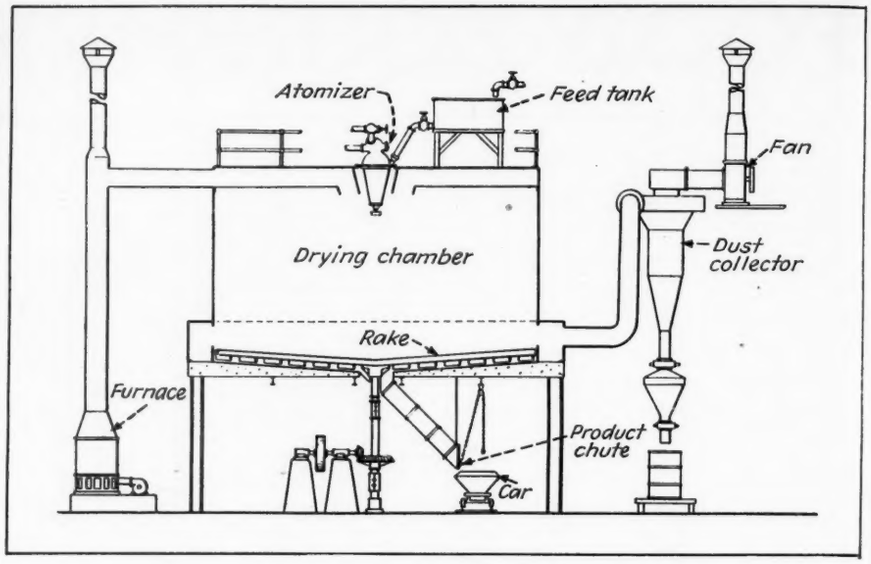


With built-in turbine. 9-63

Ingersoll-Rand

Cameron Pump Division

11 BROADWAY, NEW YORK, N.Y.



Drying system for producing powdered food products

Drying System

INDUSTRIAL ASSOCIATES, INC., 101 Park Avenue, New York, has developed a drying system applicable to food products of dry powdered form. Included among these products are banana powder, dried eggs, dried milk, powdered molasses, yeast and soups.

This system comprises an electric or steam driven atomizer, operating at 10,000 r.p.m., suspended at the top of a chamber into which hot air is admitted from a heater.

Wet material is fed by gravity or pumped to the atomizer bowl. Atomization takes place in a horizontal plane near the top of the chamber. Heated air passes through the plane of atomized wet material. Drying takes place practically instantaneously. The dried product then falls to the floor of the chamber where it is discharged by a revolving rake through a chute to a carrier or conveyor.

The exit air and vapor, and a certain amount of dust from the dried product are carried out of the chamber to a cyclone dust catcher or a wet scrubber, as required. A fan draws the heated gases through the system and discharges them to the atmosphere. Thermostatic control is employed.

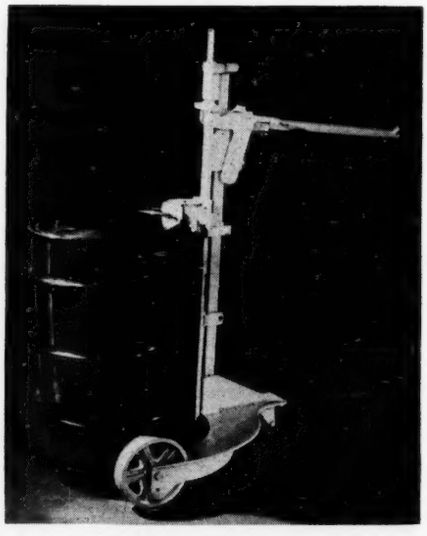
Self-Aligning Idler For Conveyor

LINK-BELT CO., 307 No. Michigan Ave., Chicago, Ill., has developed a swiveling, positive, self-aligning idler for automatically correcting misalignment of either carrying or return runs of non-reversing conveyor belts supported on flat-roll idlers. This device has a centrally pivoted cross member which, besides being equipped with a flat idler roll for supporting the belt, has a vertically mounted actuating roll at each end for making light contact with the edges of the belt in order to correct lateral misalignment. A slight pressure of the belt against either of these actuating rolls serves to swivel the idler unit on its pivot sufficiently to guide the belt automatically, quickly and positively back to its proper alignment. The contact required to do this is light so as to avoid any injury to the edge of the belt.

For flat-roll belt conveyors of reversible type, which must operate in either direction, special designs of self-aligning idlers have been made available.

Drum and Barrel Carrier

ERNST MAGIC CARRIER SALES CO., 1456 Jefferson Ave., Buffalo, N. Y. has brought out the "Little Giant" model drum and barrel carrier. This carrier is



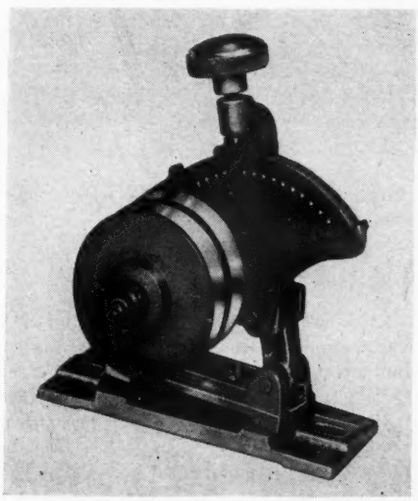
Carrier for small heavy drums or barrels.

particularly designed for carrying relatively small containers of heavy materials. It is designed for operation by one man, who can tilt, balance and move drums with the device where otherwise several men would be required. It is claimed that accidents common to handling this type of container are prevented by the simple lifting device and self-balancing three-wheel design. Handling capacity of the carrier is up to 600 pounds.

Variable Speed Control

A V-BELT variable speed transmission known as the JFS-CUB has been introduced by Standard Transmission Equipment Co., 416 West 8th St., Los Angeles, Calif. This transmission is designed for use with A section V-belts at speed ranges up to 3.3 to 1. With it, smooth-sided pulleys are used rather than the interlocking type.

Among the advantages claimed for this variable speed transmission are: the patented positive belt alignment feature



Variable speed transmission for V-belt drive

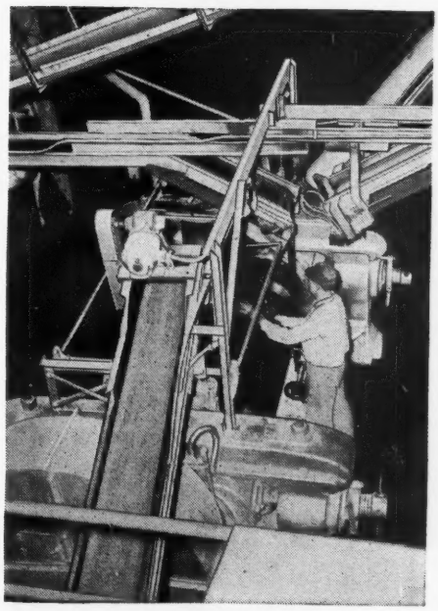
which makes possible the mounting of the transmission in any and every position without impairing its function or throwing the belt out of alignment; machined and balanced cast iron construction; forced lubrication of special bronze bearings on which the pulleys rotate; free end pulley spindles to permit easy installation of belts; both pulleys on one side of pivotal mechanism, which permits motor pulley and driven pulley to be almost directly in line with each other.

Pressure Pump

WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J., has brought out a new design of high pressure vertical

STANDARD CONVEYORS

SMASH BOTTLE-NECKS ... KEEP WORKING AREAS CLEAR FOR PRODUCTION



STANDARD Conveyors keep materials and parts moving — fast and sure — in confined, well-planned channels; they end the sprawling and spreading which hamper men and machines — the congestion that so frequently has one department waiting for the flow of materials from another department — the loss of valuable productive time. Standard Conveyor engineers have helped hundreds of manufacturers to keep production flowing—to utilize every square foot of working space more effectively—to save time and costs in handling.

What Standard Has Done For Other Manufacturers:

The Standard booklet FI-3 "Conveyors by Standard" is an interesting presentation showing conveyor applications and possibilities in a wide range of industries. Write for a copy.

STANDARD CONVEYOR COMPANY

General Offices: North St. Paul, Minn.

Sales and Engineering Service in Principal Cities

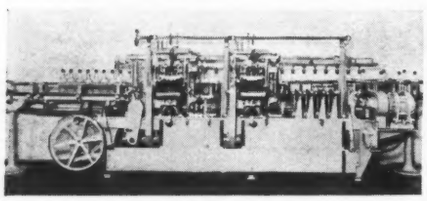
FIRST FOR FASTER PRODUCTION

"THE STANDARD OF VALUE"

Standard CONVEYORS

Look the
WORLD
Over —
You Won't Find
a Better
LABELER
for Your Job!

Full Automatic



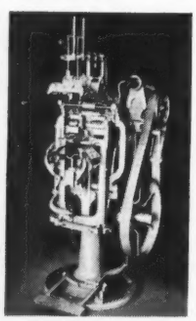
The WORLD "BEE - LINE" Straightaway

applies front or front and back labels to all kinds of containers, plain or fancy, large or small.

It puts them through gently but swiftly in a straight line without stops, detours, bangs or bumps. For dependable high quality and quantity production day in and day out the Bee-Line is the WORLD'S best bet.

Semi-Automatic

The WORLD Model S



An all 'round, super-utility Labeler that applies any size or shape of labels to any size or shape of container from ampoules to gallons. This versatile, fast working, easy to operate WORLD Labeler is solving many a labeling problem on food production lines throughout the country.

ECONOMIC MACHINERY CO.

WORCESTER, MASSACHUSETTS

triplex power pumps suitable for use with such operations as hydraulic pressing. This pump is supplied in eight sizes for pressures up to 9,800 lb. and capacities up to 51 g.p.m. It has no gears and is designed especially for use with built-in gearhead motors, although it can be arranged for V-belt drive.

Flow Alarm

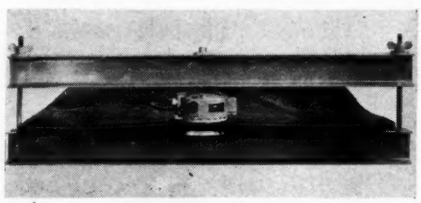
FRED H. SCHAUB ENGINEERING CO., 325 W. Huron St., Chicago, has brought out a new "Magnetrol" flow alarm for water, oil, gas or airline service, in applications where it is desirable to have a simple method of determining whether a sufficient flow is being maintained in a line, or whether flow has started or stopped. This device is designed for high or low pressure service. Operating on magnetic principles, it avoids the use of stuffing boxes, bellows, diaphragms or rotary shafts, in establishing a switching action. It consists of a full-ported globe valve body to which is attached a magnetic switching arrangement. The switch-head and valve piston assembly are arranged for ready removal for inspection. Units are available in a complete range of standard pipe sizes up to 4 inches. The standard equipped mercury to mercury electrical switch is rated at 15 amp., 125 volts, or 10 amp. 250 volts.

Welded Stainless Steel Tubing

STAINLESS STEEL TUBING produced by a new closely controlled electric welding process is now available from Globe Steel Tubes Co., Milwaukee, Wis. Resulting from a long period of experiment with various welding processes, this new welded tubing is said to provide a high degree of corrosion resistance, high strength with minimum weight, and uniformity of structure. The manufacturers state that the resistance of this new product to corrosion, combined with its high strength under adverse conditions and comparatively low cost, make it particularly suitable for food industry applications where corrosion of tubing is a factor. It is stated that this tubing will soon be available in a wide range of diameters and wall thicknesses and in practically all stainless steel analyses. The process by which this welded tubing is made is called the "Gloweld."

Conveyor Belt Vulcanizer

B. F. GOODRICH CO., has brought out the Type RO patch vulcanizer for maintenance work on conveyor belting. Designed for repairing the covers of conveyor belting, this vulcanizer is round in shape, 10 in. in diameter, and of the single seated platen type. It clamps against a steel plate 12 in. in diameter, held against the opposite side of the belt.



Patch vulcanizer for maintenance of rubber conveyor belts.

Lightweight Fork Truck

THE CLARK TRUCTRACTOR DIV., Clark Equipment Co., Battle Creek, Mich., has brought out a line of lightweight fork-type power trucks for use in food factories where weak floor construction or limited elevator capacity makes a lightweight truck desirable. These are available in six models, in capacities of

Lightweight lift truck of fork type for use in food processing plants.

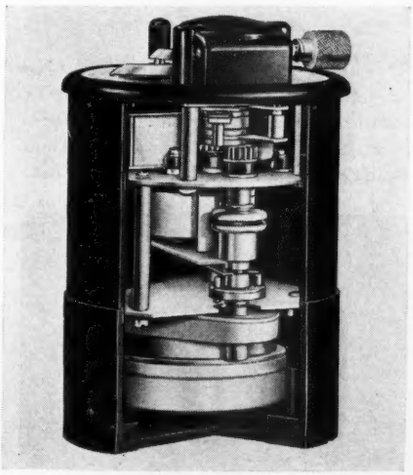
1,000, 1,500 and 2,000 lb., with standard lifting heights of 50 to 108 inches. The models, known as the "Clipper" truck, are powered with four-cylinder industrial type gasoline truck engines and have front wheel drive and rear wheel steer. The lift and tilt are hydraulically operated.

Electric Time Relays

R. W. Cramer Co., Centerbrook, Conn., has brought out Types RS1C and TD1C synchronous motor operated time relays. These are for the purpose of either keeping an electrical circuit closed for a preset time interval or, in the case of Type TD1C, for use as a time delay relay which when energized keeps a circuit open for a selected interval.

Both these timers have an instantaneous reset feature and when restarted, they repeat the timing without manual resetting. They are available with an in-built manual start button, or can be supplied for remote control start button. Also, auxiliary contacts can be furnished for audible or visual signal circuits.

The manufacturers state that these time relays are designed for use in industrial processing where operating



Type RS1C time relay for the control of industrial processing operations.

time must be controlled, or for electrical circuits where a time delay action is required.

Among the distinctive features claimed by the manufacturers are reliability, compactness, easy accurate setting means, a dust-tight motor and contact assembly, and a progress indicator which is an additional pointer, mounted on the control shaft, rotating with the switch operating member and showing at all times how much of the cycle has elapsed, or the time interval before the switch trips.

Water Control for Boilers

A system of multiple boiler water control for maintaining safe and proper water levels in two or more boilers when operating with only one boiler feed pump, has been brought out by Johnson Corporation, Three Rivers, Mich. In this system, each boiler water level is controlled separately and water added independently of the other boilers, as the need arises. The system is electrically controlled, is automatic in operation, simple in construction, and said to insure dependable operation.

With this control, two stationary electrodes of different lengths are mounted in a holder on each boiler. There are no moving parts to jam or clog or to become inoperative because of scale accumulation. The electrode holder can be mounted on the water glass column, or can be connected to other suitable openings in the boiler.

When the water level in any boiler falls below the longer electrode, an electric circuit is disturbed which, through a relay, starts the boiler feed pump. At the same time a motor-operated valve is opened to divert the pump discharge into the boiler requiring the water. When the water level reaches the desired level, the pump stops. When necessary, all boilers can be fed simultaneously. Low water alarm, or low water cutoff on stoker or burner can also be provided for each boiler.

This boiler water control is suitable for pressures up to 150 lb. and is built for boilers of sizes up to 250 hp. It can be used with any type of steam or motor-driven boiler feed pump.

Metering Hand Pump

Blackmer Pump Co., Grand Rapids, Mich., has brought out the Type BY-809 hand pump designed for dispensing liquids primarily from under floor storage where accurate measurement is important. This pump has a capacity of 20 g.p.m., though other units with capacities from 7 to 25 g.p.m. are available. The dial on the meter is calibrated in pints, and one revolution of the hand crank indicates one quart. A reset device is provided for measuring quantities less than quarts. The unit is equipped with a drip pan large enough to accommodate a 5-gal. container. This pan is attached to the upright pump support and is equipped with a drain pipe leading back into the storage tank.

The complete unit for use with underfloor or underground storage, consists of a pump, crank, meter, spout, drip pan and return pipe, pedestal base and support. For use with drums or barrels, the unit can be furnished without the pedestal base, support pipe and drip pan assembly, and equipped with a standard bung attachment and suction pipe.

For Complete Single or Multiple Separations

BAR-NUN *Rotary* SIFTER

Sugar, gelatin powders, cereals and many other dry powdered or granular food products are sifted thoroughly, efficiently and at low cost with this modern machine. Its mechanically controlled, complete rotary motion assures smooth operation and low maintenance cost for years. Many different, space-saving installations can be suggested by our competent engineers. If you need new equipment to better serve National Defense, for grinding, sifting, packing, or weighing, write us today. No obligation.

B. F. Gump Co

Established 1872

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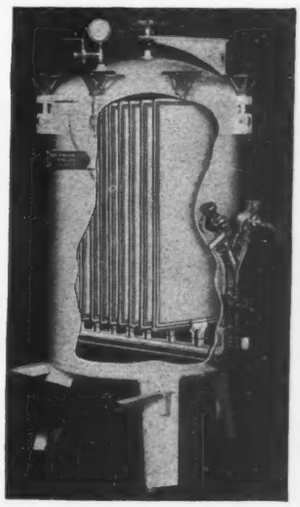


Will Do It Better!

If your problem involves clarification of any food or chemical products, all metal, quickly cleaned, high flow rate, MASTER-AID Filters will do it better.

Already operating successfully for many nationally advertised products.

Especially efficient used with filter-aids in liquid filtration.

Chas. S. JACOBOWITZ Corp.

1432 Niagara St. Buffalo, N. Y.

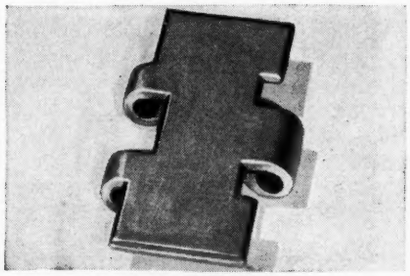
"HERE'S THE KIND OF CONVEYING YOU ASKED FOR," I* told him

*THE REX MAN

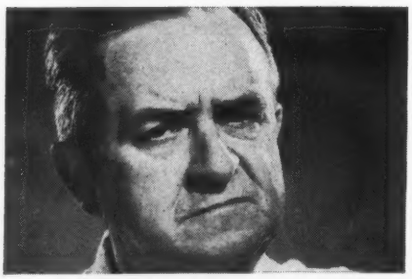
SMOOTH, LONG WEARING, STEADY AS A TABLE TOP!

① "IT'S REX TABLETOP—a chain belt introduced nearly three years ago which has become the standard for some of the biggest machinery manufacturers in the food packaging field! And here's why..."

② "TABLETOP IS A NATURAL—extremely simple, basically right! Smooth gliding, flexible as a belt, it presents the closest approach to a moving table top ever offered in a food industry conveyor!"



③ "AS SIMPLE AS A DOOR HINGE! No attachments or rivets to work loose or wobble. Accurately beveled edges form a surface so smooth and steady that annoying pile-ups can be taken off your list."



④ "SAY, THAT MIGHT be something! I imagine it would help make for smoother transfers, too. But wouldn't it be quite a bit of trouble for me to make a change-over from the chain belt I'm now using?"

⑤ "ABSOLUTELY NOT! This book tells the whole story—how you can make the change-over without even revising your runways! The first cost of Rex TableTop is sensationally low, too! I'll leave a copy."

⑥ "YES, YOU'D BETTER do that," he said, "because we're starting to design some new filling and sealing machinery on which this Rex TableTop should fit like a 'T.' I'll certainly go into it!"

Rex TableTop chain belts and all other Rex food machinery chain belts are being put to extensive use during the current emergency. It's best now to anticipate your requirements as far ahead as possible. Naturally, those orders bearing the highest priority rating take precedence. Address: 1616 West Bruce Street, Milwaukee, Wisconsin.

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CHAIN BELT COMPANY OF MILWAUKEE

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BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Bottling Conveyors—Flexible chains, flexible in all planes, for use in bottling plant conveyors are described and illustrated in an 8-page bulletin of A-1 Bottling Machinery Co., Dover, N. J.

Colloid Mills and Mixers—Various types of colloid mills and mixers, for producing fine disintegration, dispersions and emulsions, as well as for mixing and agitating operations, are described and illustrated with specifications in a 16-page bulletin entitled "Better-Products, More Profitably Processed," issued by Premier Mills Corp., Geneva, N. Y.

Heat Exchangers—Heaters, coolers and condensers of the heat exchanger type, tube and shell design, also tank and coil design, are briefly described and illustrated in a folder issued by Downingtown Iron Works, Downingtown, Pa.

Processing Equipment—By illustrations and brief descriptions, a line of processing equipment for feeding, weighing, conveying, cooling, drying, packing, screening, crushing and pulverizing is described in Catalog 765, a 20-page publication of the Jeffrey Mfg. Co., Columbus, Ohio.

Screening Equipment—Two types of vibrating screening equipment, the "Selectro" and and the "Gyroset" are described with application information and specifications in Bulletins 441, 939, and 1237, published by Productive Equipment Corp., 4600 So. Kedzie Ave., Chicago.

PLANT SUPPLIES

Automatic Valves—Various types of reducing valves, temperature regulators, pump governors, relief valves and back pressure valves are described with specifications and application data, together with a selection of useful engineering data, in loose-leaf catalog No. 70, issued by Foster Engineering Co., 109 Monroe St., Newark, N. J.

Lubrication System—Information on centralized lubrication systems for production equipment is given with illustrations and charts in an 8-page bulletin entitled "Why Farval" issued by the Farval Corp., 3293 E. 80th St., Cleveland, Ohio.

Magnetic Separators—Magnetic pulleys and pulley-type separators for removing magnetic metallic materials from the flow of foodstuffs and other products while being conveyed or moved, are described with specifications and application data in 32-page illustrated bulletin No. 250 issued by Dings Magnetic Separator Co., Milwaukee, Wis.

Power Supply—"One Cent per Kilowatt Hour for Electricity" is the title of a 20-page illustrated booklet, describing the advantages of generating electricity with diesel operated generator sets in various types of industrial applications, including those in the food field, issued by Caterpillar Tractor Co., Peoria, Ill.

Pumping Equipment—The Huber "Squeegee" type pump, using a flexible rubber tube as a pumping unit and hence protecting against corrosion, is described in a recent folder issued by Downingtown Mfg. Co., Downingtown, Pa.

V-Belt Drives—Descriptions of Texsteel and Texdrive sheaves, steel and cast iron sheaves for V-belt drives from fractional to 25 hp., are given in Bulletin B-6047, a 12-page illustrated publication of Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Variable Speed Drive— P. I. V. Gear variable speed transmissions in units from ½ to 15 hp. and with ratios up to 6 to 1 are illustrated and described with specifications in 52-page Catalog No. 1874 of Link-Belt Co., 307 No. Michigan Ave., Chicago.

CONTROL EQUIPMENT

Control Equipment—Thermometer and pressure gage accessories as used with indicating, recording and controlling instruments, are described and illustrated in 24-page catalog No. 6706-A, by Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Control Equipment—Accessory equipment for use with pneumatic controllers, including control valves, diaphragm motors, valve positioners, power cylinders, pressure regulators, filters, and other equipment, are described with specifications and charts in 24-page bulletin No. 89-14, issued by the Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Control Equipment—"Industrial Control Devices" is the title of a 56-page catalog describing and illustrating three classes of automatic control—electric, pneumatic and combined electric and pneumatic—together with complete specifications, issued as Catalog No. 8301 by the Brown Instrument Co., Wayne and Roberts Aves., Philadelphia, Pa.

Feedwater Regulator—The "Campbell" boiler feedwater regulator, a device operating with no float, thermostat, generator, links or moving parts, is described and illustrated in a six-page folder issued by Atlas Valve Co., 208 South St., Newark, N. J.

Humidity Control—Kathabar, a system of positive humidity control for processing atmospheres is described in three recent folders issued by Surface Combustion Corp., Toledo, Ohio.

Humidity Recorders—Portable humidity recording instruments of the circular chart type are briefly described in an illustrated folder, Bulletin 554A, issued by the Bristol Co., Waterbury, Conn.

Oven Temperature Controller—The "Electronic" Pyrometer Controller, for controlling temperatures in ovens, is briefly described and illustrated in Bulletin No. 544a, issued by the Bristol Co., Waterbury, Conn.

LABORATORY CONTROL

Electrophotometer—The Model AC electrophotometer for colorimetric analysis, for use in testing beverages, gelatine, and many other materials, is described in an illustrated folder of Fisher Scientific Co., Pittsburgh, Pa.

MISCELLANEOUS

Bottle Washing—"Alkali for Beverage Bottle Washing" is the title of a folder describing the use of "Anchor" alkali in cleaning and sterilizing beverage bottles, issued by Solvay Sales Corp., 40 Rector St., New York City.

Equipment Cleaning—Compound No. 32, a material designed for removing lime scale and rust deposits from cookers, blanchers, kettles, tanks and other processing equipment, is described in a 20-page booklet published by Oakite Products, Inc, 26G Thames St., New York City.

Milkstone Remover—A cleansing product, particularly developed for removing milkstone deposits from all sorts of dairy equipment, is described in a folder issued by Oakite Products, Inc., 22 Thames St., New York.

LUBRIPLATE lubricants are manufactured in various fluid and non-fluid densities to meet every condition and are packed in containers from one to five hundred pounds.

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That may sound like a bold statement—but it is being proved daily by thousands of users in every industry. LUBRIPLATE lubricants reduce friction and wear, save power and greatly prolong the life expectancy of plain and anti-friction bearings, gears, chains and other machine parts regardless of how tough the operating conditions may be. LUBRIPLATE is different from conventional lubricants—and is not only superior for modern machinery—but it enables old production machines to be stepped up to today's requirements. In these days of extreme emergency when machines are run at top speeds, and when replacement parts are hard to get—*LUBRIPLATE IS AN ESSENTIAL.* Write today for your copy of "THE LUBRIPLATE FILM" describing the use of LUBRIPLATE in the FOOD INDUSTRY.

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DEALERS FROM COAST TO COAST

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THE MODERN LUBRICANT *that Arrests Progressive wear*

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LETTERS TO THE EDITOR

"So Absurdly Simple"

To the Editor
of FOOD INDUSTRIES:

In your December issue, in the Department "Talk of the industry" (page 31) you included an article "Is Nutrition Program Bogging Down?"

Whoever wrote that article is either woefully lacking in nutritional knowledge . . . or else he is guilty of malice a-fore-thought Public Health sabotage!

While it is quite possible that the Governmental Doctors (being primarily doctors instead of trained writers) may have been vague, or perhaps merely brief, in explaining the differences between natural and synthetically "built-up" chemicals, that, in itself, does not excuse the writer of that article. . . . For the FACTS ARE AVAILABLE.

The dream that chemists could concoct various substances so that Mankind could be adequately nourished almost, or perhaps completely from the product of test-tubes has been, through experiments upon unsuspecting men, women and children, utterly disproved . . . and is in the process of being speedily and utterly discarded.

The reason the discarding will be speedy is because, during the totally unwarranted experimentation, real scientists have become able to trace the operation of a NATURAL LAW of which they were, previously, ignorant.

The TRUTH IS SO ABSURDLY SIMPLE, containing, as it does, the key to natural cure of many human and animals diseases and ills, that it is not at all surprising that "Doctors" who formerly advocated synthetic food chemistry, are (to speak mildly) greatly embarrassed!

Hence it is really not surprising that "food processors" are confused and resentful . . . that is if they know nothing of digestive processes *in* human and animal bodies.

There is a vast amount of truly scientific data showing the harm to human and animal organisms resulting from the use of "robbed and synthetically 'enriched'" concoctions. . . . No amount of high power salesmanship, no amount of high powered collective bargaining can ever find a way to change NATURAL LAWS.

Hence, if "food processors" have any common, everyday, horse sense they will change their products from National Health liabilities, menaces or downright nuisances (as their individual case may be) into something the NATION *actually* NEEDS.

This Nation needs to save paper for constructive uses. . . . Using space in your magazine to ridicule honest doctors is not being either humane or patriotic. . . . Furthermore its hitting below the belt for honest doctors have no time, now, to reply to those who think first of financial gain and last of the needs of HUMANITY.—MRS. MARY C. BARRETT, *Atlanta, Ga.*

Freezing Bread

To the Editor
of FOOD INDUSTRIES:

The Birdseye laboratory did a whole lot of experimenting with bread and dough freezing—and by the latter I don't mean frozen assets. Those experiments indicated that frozen fresh bread, properly protected from desiccation, could be kept in storage for a good many months without becoming stale; but I can recall absolutely nothing in our experience to indicate that freezing, either quick or slow, would make stale bread fresh!—CLARENCE BIRDSEYE, *Gloucester, Mass.*

How to Get Preference Ratings

To the Editor
of FOOD INDUSTRIES:

Reference is made to an article that appears in the current issue of FOOD INDUSTRIES (January, 1942) under the caption, "Preference Ratings Are Your Job."

We wish to commend you upon this article as it is most helpful to us in our work, which is still largely a matter of disseminating information and educating industry as to the proper procedure in regard to priority matters.

There is one statement in this article that is not quite correct. On page 40, second column, fifth paragraph, it is stated that a rating which has been assigned by the Quartermaster Department of the Army to a jobber of canned tomatoes can be extended in turn to the canning plant by the jobber, and then to the maker of a labeling machine needed for the production of the order. A rating may be extended for the procurement of materials going into the product, but not for equipment such as a labeling machine needed to do the work. However, we have generally looked upon applications when submitted on form PD-1 favorably, when the applicant is working on war orders and finds that he needs additional equipment.

It will be appreciated if you will publish this correction as it is a matter that has given us a great deal of concern because a large number of the members of the various industries believe that the statement you have made in this paragraph is correct.—N. G. BURLEIGH, *Chief, Industrial and Office Machinery Branch, OPM (by* ROBERT F. WILSON, *Chief, Food Products Machinery Section).*

Who Will Answer This Query?

To the Editor
of FOOD INDUSTRIES:

As a result of war conditions, some of our confectionery principals are finding it rather difficult to provide merchandise, owing to the fact, for example, that Cellophane has been restricted to 50 percent of previous years' supplies; cardboard is being curtailed; paper cups are impossible to procure in Canada; ribbon for fancy boxes has been restricted; and no doubt as time goes on, other difficulties will present themselves. As a consequence, there will need to be a complete revamping in merchandising and displays, and a swing back, possibly, to bulk.

In the light of this, we would appreciate your suggestions and ideas as to how best to merchandise, to display, to feature, to create consumer interest, and to try and educate the retailer.

In Canada, we might add that we have a Wartime Prices and Trade Board, which is definitely out to prevent inflation from the standpoint in particular of advanced prices to the consumer, which is another angle that must be considered.

Any suggestions or ideas that you might give, will be greatly appreciated. —N. M. JACKSON, McBride, Jackson, LTD., *Calgary, Alberta, Canada.*

SO_2 in Fruit Not Harmful

To the Editor
of FOOD INDUSTRIES:

Your issue of January, 1942, contains some very sound observations as to the necessity of planning for alternative methods of preservation of perishable foods and, in addition, a splendid article on the method of sulphuring fruit for shipment to Great Britain under Lease-Lend.

There is, however, one phase of the latter subject which we believe should be called to the attention of your pub-

Hackney

BARRELS and DRUMS

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THE *DEPENDABILITY*
THAT GIVES
LONG - TERM *ECONOMIES*

Year after year Hackney barrels and drums afford important economies . . . provide easy and rapid handling . . . and assure the safe arrival of contents.

Hackney Removable Head Welded - Type Drum with I-Bar hoops—and Toggle-tite closure.

Seams, cracks, and crevices have been eliminated in Hackney barrels and drums. The interiors are smooth, flawless . . . assuring easy, complete cleaning. The Toggle-tite (or single bolt) closure securely holds the head air- and liquid-tight, preventing leakage or the entrance of foreign matter. Because they've been constructed by the Hackney process of cold-drawing, they are more resistant to hard knocks and transportation abuse. An agitator can be installed in Hackney drums or barrels—assuring effective agitation of contents.

There's a Hackney returnable barrel or drum to meet your requirements, exactly and economically. Write today for full information.

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Containers for Gases Liquids and Solids

lic. The article reads in part as follows:

"Tommies' tummies, however, must be tougher (or something) than the home grown brand for Great Britain permits the importation and use of these sulphured products with no apparent ill effects."

The essential feature of the use of SO_2 as a preservative is that it is volatile and is, therefore, removed on subsequent reprocessing. Actually, good manufacturing practice in the United Kingdom does not permit residual SO_2 in excess of 7 p.p.m.—3 or 4 p.p.m. being a common figure. This amount, of course, is negligible and entirely without deleterious effects, as instanced, for example, by the fact that U. S. regulations permit the sale for direct consumption of dried California fruits, such as apricots, containing 200 p.p.m.

If for no other reason than the necessity for the conservation of tinplate, it may be necessary, during the next year or two, to revise radically our present methods of preserving fruit even for home consumption. Under these circumstances, we believe it would be most unfortunate if any alternative method is unfairly or, at least, unnecessarily stigmatized and we, therefore, suggest that you bring these facts to the attention of your public at the earliest possible opportunity.—J. T. MENZIES, *President, The Crosse & Blackwell Co., Baltimore, Md.*

Kind Words

To the Editor
of FOOD INDUSTRIES:

I feel a word of appreciation is always acceptable. Therefore, I just want to tell you that I appreciate the type of material that you are publishing in the FOOD INDUSTRIES. For example, I have heard you and other highbrow chemists talk glibly about pH, but I never had a thorough understanding of it until I read your December issue.

We are all having headaches about priorities, and here in the January issue is a very fine treatise on the subject.

We did not think we would have to go through another war, but since we must do so it is fortunate that our leading food journal is edited by an old gray headed codjer that went through the last one and has the ability to use history when prophesying the future.—G. G. HOSKINS, *Consulting Engineer, Chicago, Ill.*

PATENTS

Water Softened by Use of Ethanolamine Citrate—Nathaniel Beverly Tucker, Glendale, Ohio, to Proctor & Gamble Co., Cincinnati, Ohio. No. 2,264,103. Nov. 25, 1941.

Dough in Lump Form Mechanically Converted Into Sheets and Cut into Strips in Continuous Manner—George Frederick William Grainger and Edward Milner Crosland, Earlestown, Newton-le-Willows, England, to T. & T. Vicars Limited. No. 2,-264,115. Nov. 25, 1941.

Fruits Peeled, Cut in Halves and Juice Extracted From Each Portion in Successive Steps by Mechanical Means—Frank D. Chapman, Berlin, Wis. No. 2,264,361. Dec. 2, 1941.

Nuts Cracked by Mechanical Means—Leo J. Meyer, San Antonio, Tex., to Champion Pecan Machine Co. No. 2,264,394. Dec. 2, 1941.

Yellow Corn Grits Converted Into Puffed Cereal Products—John L. Kellogg, Chicago, Ill. No. 2,264,574. Dec. 2, 1941.

Salad Dressings, Ice Cream and Like Stabilized by Nontoxic Monochloracetic Acid Compound Formed by Reaction Between Monochloracetic Acid and Gelatin—Abraham Schapiro, Chicago, Ill. No. 2,264,593. Dec. 2, 1941.

Milk Clarified and Standarized for Cream Content in Continuous Manner—Selden H. Hall, Poughkeepsie, N. Y., to De Laval Separator Co., New York, N. Y. No. 2,-264,665. Dec. 2, 1941.

Bread Given Increased Vitamin and Mineral Content by Inclusion of Fresh Green Spinach in Dough Batch—Rosilda C. Savale, Orange, N. J. No. 2,264,721. Dec. 2, 1941.

Fish Mechanically Packed by Rotary Reciprocating Unit—Merton L. Dodge, Seattle, Wash., to Continental Can Co., Inc., New York, N. Y. No. 2,265,152. Dec. 9, 1941.

Evaporated Milk Given Content of Stable Sterilized Emulsion of Vitamin D_2—Reginald C. Sherwood, St. Paul, and Charles G. Ferrari, Minneapolis, Minn., to General Mills, Inc. No. 2,265,320. Dec. 9, 1941.

Chewing Gum Made to Have Finished Moisture Content of From 3 to 5 Percent Through Use of Dried Corn Sirup—Robert L. Wilson to Wm. Wrigley, Jr., Co., Chicago, Ill. No. 2,265,465. Dec. 9, 1941.

Nuts Cracked on Machine Equipped With Series of Inclined Reciprocal Screens to Separate and Grade Nut Particles for Size—James B. Walker, Altherton, Mo. No. 2,-265,588. Dec. 9, 1941.

Fish Oil Recovered From Press Liquor—Herbert Hempel, Essex, Mass., to Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass. No. 2,266,036. Dec. 16, 1941.

Gum Confectionery Made to Contain Starchy Material With Small Quantity of Added Diastatic Enzyme and Acid Constituents Such As Cream of Tartar or Fruit Acids—Herman Lebeson, Chicago, Ill. No. 2,266,-051. Dec. 16, 1941.

Normally Liquid Food Frozen Into Predetermined Units and Subjected to Breaking-up and Beating Action to Form Cold Flowable Plastic Mass With Desired Overrun, Preparatory to Casting Into Receptacle for Consumption in Cold Plastic State—Russell Stover, Kansas City, Mo. No. 2,266,093. Dec. 16, 1941.

Foods to be Smoked Subjected to Vacuum in Compartment Equipped With Fuel Receptacle and Means for Gradually Admitting Combustion-supporting Gas Preparatory to Smoking Under Conditions Which Favor Increased Penetration of Smoke Into Product and Elimination of Deleterious Condensation Products of Combustion Upon the Food—Christian Thon, Oslo, Norway. No. 2,266,131. Dec. 16, 1941.

Cheeses Molded Into Desired Shapes by Pair of Opposed Complementary Perforated Cups Reinforced With Band to Permit Application of Pressure—Kenneth M. Royer, Mayville, Wis. No. 2,266,336. Dec. 16, 1941.

Animal Carcasses Suspended on Trolley Conveyors From Both Hind and Fore Shanks With Back Side Down Preparatory to Chilling—Frank B. Bratek and Andrew S. Hartanov, to Industrial Patents Corp., Chicago, Ill. No. 2,266,487. Dec. 16, 1941.

Meat Cured by Holding in "Cure" Solution and in Contact With Nitrite-containing Cloth—Levi Scott Paddock and Cleo A. Rinehart to Industrial Patents Corp., Chicago, Ill. No. 2,266,492. Dec. 16, 1941.

Citrus Fruits Sprayed With Dye in Volatile Organic Solvent and, After Evaporation of Solvent, Brushed to Heighten Varietal Color by Impregnation of Dye Into Skin—Jagan N. Sharma, Los Angeles, Calif., to Food Machinery Corp., San Jose, Calif. No. 2,266,571. Dec. 16, 1941.

Salad Oils Winterized Through Addition of Small Amount of Ester of Fatty Acids—Eddy W. Eckey and Edwin S. Lutton, Wyoming, Ohio, to Proctor & Gamble Co., Ivorydale, Ohio. No. 2,266,591. Dec. 16, 1941.

Ice Cream in Bulk Cut Into Consumer Units and Given Chocolate Covering by Mechanical Means—Joseph F. Hagerty, Fremont, Ohio. No. 2,266,635. Dec. 16, 1941.

Natural Cheese Packaged in Wax-rubber Film Surrounded by Outer Vented Wrapper as Protection Against Mold Growth, Loss of Moisture and Development of Bitter Surface Flavor—Allen Abrams, Wausau, and Charley L. Wagner, Menasha, Wis., to Marathon Paper Mills Co., Rothschild, Wis. No. 2,266,700. Dec. 16, 1941.

Fat-soluble Vitamin-containing Material Refined by Treatment With Solvent From Hydrocarbon and Halogenated Hydrocarbon Group Containing Relatively Small Amount of Oxygen-containing Organic Compound With Polar Functional Grouping—Loran O. Buxton, Belleville, N. J., and Eric J. Simons, New York, N. Y., to National Oil Products Co., Harrison, N. J. No. 2,266,719. Dec. 16, 1941.

Vitamins Extracted From Oils by Saponification With Subsequent Treatment With Methylene Chloride and Separation of Unsaponifiable Fraction—Harden F. Taylor, Arthur W. Wells and Vladimir A. Nedzvedsky to The Atlantic Coast Fisheries Co., New York, N. Y. No. 2,266,830. Dec. 23, 1941.

Citrus Fruit Juices Tested to Determine Presence of Active Enzymic Content—Jesse W. Stevens, Ontario, Calif., to California Fruit Growers Exchange, Los Angeles, Calif. No. 2,267,050. Dec. 23, 1941.

Canadian Patents

Ice Cream Stirred in Freezer by Agitator Having Inner, Intermediate and Outer Elements, All of Like Length—Chas. F. Weinreich, Desplaines, Ill., and A. L. Voggenthaler, Cedar Rapids, Ia., to Cherry-Burrell Corp., Chicago, Ill. No. 400,826. Nov. 18, 1941.

Food Products Sweetened With Concentrate Prepared by Dissolving 4 Oz. of Sodium Bicarbonate and 10 Oz. of Saccharin in Gallon of Water Containing 26 Oz. of Alcohol—Joseph A. A. Brodeur, Ste. Genevieve, Quebec, No. 400,920, Nov. 25, 1941.

Bottled Milk Protected by Cap Having Disk-shaped Portion With Upstanding Ribbed Peripheral Flange Which Engages Periphery of Disk When Cap is Applied to Bottle—John F. Price, to Oswego Falls Corp., Fulton, N. Y. No. 401,009. Nov. 25, 1941.

Milk and Other Perishable Food Products Bottled in Seamless Transparent Self-supporting Containers of Truncated-cone Shape; Formed From Cellulose Acetate Sheet Sealed With Cellulose Acetate Foil; Cemented With Vinyl Resin Adhesive—Wm. H. Moss, to Henry Dreyfus, London, England. No. 401,207, Dec. 2, 1941.

Milk and Other Perishable Foods Retailed In Cylindrical or Tapered Seamless Transparent Containers Formed from Cellulose Acetate, With Flange Around Top Much Thicker Than Side Walls—Wm. H. Moss, to Henry Dreyfus, London, England. No. 401,208, Dec. 2, 1941.

Fish Liver Oils Extracted by Mixing Disintegrated Livers With Dry Salt and Alkali, Allowing First Oil to Run off, Immersing Residue in Warm Water and Pressing—Hartley A. Wentworth, St. Andrews by the Sea, New Brunswick. No. 401,447, Dec. 16, 1941.

PROTECTION AGAINST ROUGH HANDLING

With greater responsibility being put on shipping containers by today's high speed shipping and handling, the extra strength and durability of Bemis Waterproof Bags become more and more important. Here are containers built to stand rough handling . . . to take knocks, bumps, and the strains of stacking . . . to deliver their contents safely.

And, in addition, these Bemis shipping containers can be made to keep moisture in and dampness out—retain desirable aromas and repel objectionable odors—shut out dust and dirt—resist acids and grease.

WATERPROOF DEPARTMENT

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BOOKS

Data on Raw Materials

AGRICULTURAL STATISTICS 1941. Published by the U. S. Department of Agriculture. 731 pages; 6x9¼ in.; paper. Price, 75 cents; for sale by Superintendent of Documents, Washington, D. C.

A companion volume to the Department of Agriculture's Yearbook, it contains the information formerly published in the statistical section of the yearbook. It gives the acreage, yield and production of crops, data on "commercial" crops, prices received by farmers, livestock production, market supplies and prices and imports and exports. There are also miscellaneous agricultural statistics on weather, roads, forestry, and so forth.

Climate and Man

DEPARTMENT OF AGRICULTURE YEARBOOK 1941. Published by the U. S. Department of Agriculture. 1,200 pages. Price, $1.75; for sale by Superintendent of Documents, Washington, D. C.

Published under the title "Climate and Man," this is the sixth of a series of yearly volumes started in 1936. A major feature of it is a compilation of weather records, probably the most complete ever made available. Preceding a reference section on local weather records are several articles giving comprehensive information on the new weather science developed in the past 20 years, which gives some promise of developing into long-range forecasting. Five- to seven-day forecasts are now approximately as reliable as the former two- and three-day predictions.

More Mileage From Tires

OPERATOR'S HANDBOOK. Published by B. F. Goodrich Co., Akron, Ohio, 1942. 96 pages; 3¾x6½ in.; paper. Free.

Coming at a time when tires for trucks are rationed and in some instances entirely unavailable, this booklet on how to get the most service out of tires is a valuable tool for operators of motor vehicles in the food industries. In the section Factors Governing Truck Tire Service are practical instructions and specifications on overloading, inflation, speed, load analysis and balance, uneven tread wear and temperatures.

A tire overloaded as little as 20 percent gives only 70 percent of its normal mileage. Either under inflation or over-inflation reduce tire life considerably; inflation should be checked every week. Reversed camber on dual wheels may throw as much as 40 percent more load on the inside than the outside tires. These are a few of the facts in the booklet.

Merchandising Ideas

NEW IDEA BOOK FOR FOOD MERCHANTS. Edited by Ralph F. Linder. Published by the *Progressive Grocer*, 161 Sixth Ave., New York, N. Y. 119 pages; 12¼x9¼ in., cloth. Price, $3.

While this report is intended primarily to present new ideas for retail outlets, it also contains valuable point-of-sale merchandising and distribution hints for the manufacturer.

21 Onions Described

DESCRIPTIONS OF TYPES OF PRINCIPAL AMERICAN VARIETIES OF ONIONS. Published by the U. S. Department of Agriculture as Miscellaneous Publication No. 435. 1941. 81 pages; 9⅛x11½ in.; paper. Price, 50 cents; for sale by Superintendent of Documents, Washington, D. C.

Prepared jointly by specialists of the Department of Agriculture, Massachusetts State College and the experiment stations of California, Ohio, Texas and Utah, this work covers 21 varieties of onions. In discussing each type the authors outline its characteristics and explain briefly for what the variety is adapted. The growing season and characteristics of the plant, leaves, sheath column and matured cured bulb are also covered. Several samples of each variety are illustrated, and 12 varieties are shown in color.

Grain Standards

HANDBOOK OF OFFICIAL GRAIN STANDARDS OF THE UNITED STATES. Prepared by the Agricultural Marketing Service, U. S. Department of Agriculture, 1941. 101 pages; 5¾x3½ in.; paper. Price, 15 cents, for sale by Superintendent of Documents, Washington, D. C.

Official government standards and definitions are listed for the following grains: Wheat, effective October 1, 1937; corn, effective January 20, 1937; barley, effective July 1, 1937; oats, effective July 1, 1941; feed oats and mixed feed oats, effective July 1, 1935; rye, effective July 1, 1941; grain sorghums and flaxseed, effective July 1, 1935; soybeans, effective September 1, 1941, and mixed grain, effective July 1, 1935.

The book also includes a short analysis of grain inspection.

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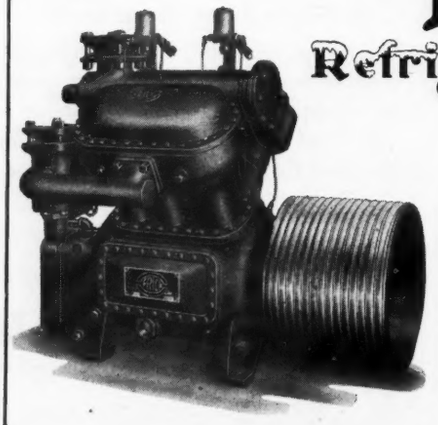

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Facts About Caffeine

(*Continued from page 53*)

trichloroethylene and tetrachloroethane as solvents for the extraction of caffeine and theobromine from a water solution such as may be obtained by applying the first step of the Decker-Kunze method. The former, trichloroethylene, seemed preferable since its boiling point (86.9 deg. C.) is low enough to facilitate its removal by evaporation on a steam bath. It was found, however, that (in the supply available, at any rate) it could not be kept neutral even though it was washed free of acid and redistilled at intervals. When an attempt was made to use it in a continuous extractor at the Palkin type[8] the acidity increased so rapidly as to cause the separation of tarry materials from the solution. Use in a separatory funnel on several trials gave the same sort of results.

For the above reason, the use of the tetrachloroethane was considered. Its boiling point (144-146 deg. C.) is fairly high and there was a possibility that caffeine or theobromine, or both, might be lost if a solution of these substances in it was distilled down to small volumes (to recover most of the tetrachloroethane) and the balance evaporated on the steam bath with the aid of an air jet. Weighed amounts of caffeine U.S.P. and theobromine U.S.P. (purity determined in each case by nitrogen determinations) were added to 300 c.c. of tetrachloroethane, the solvents distilled off down to about 10 c.c. and the balance evaporated on the steam bath. The residue was treated with benzene, theobromine filtered from the solution of caffeine, and nitrogen determined on both. Recovery was 99.8 percent in each case. It was found to be impossible to use tetrachloroethane in a Palkin extractor since the high temperature of the vapor caused the water solution of the caffeine and theobromine to boil. It might be possible to modify this apparatus so that the hot vapor of the solvent would go directly to the condenser without passing through the extraction tube. If this were done, it undoubtedly would result in a saving of time and attention needed.

In the absence of such a device, trials were made of hand extraction in a separatory funnel. Weighed amounts of caffeine and theobromine were dissolved in 50 c.c. of warm water, cooled, washed into a separatory funnel to 75 c.c. and made faintly alkaline with sodium hydroxide. Four extractions, using 50 c.c. of tetrachloroethane each time, were made and combined in a round bottomed 500 c.c. flask. The solvent was then distilled off down to 10 c.c. This residue was extracted from the residue with benzene and nitrogen determinations made. All of the caffeine and about 75 percent of the theobromine were extracted by the first four extractions. Two more sets of four extractions each made in the same manner removed all of the theobromine.

The method was then applied to the sweetened milk chocolate mentioned above using a 15-gram sample which was boiled with magnesia and water, centrifuged and filtered as described above. The combined extracts were evaporated down to 50 c.c., washed into the separatory funnel to 75 c.c., made faintly alkaline and extracted with tetrachloroethane as above. The mixture tended to emulsify somewhat during the first few extractions but afterwards separated freely. The extracts were filtered through a small plug of cotton into the distilling flask in each case. All of the caffeine was extracted by 12 portions of solvent while the theobromine required 16 to 20 portions. This, of course, is a rather large number of extractions to have to use.

A sample of another bar of the same brand of chocolate was also analyzed by extracting with magnesia and hot water as above, evaporated to about 50 c.c. and then washed into the Palkin extractor. Chloroform was used in a continuous extraction for about 20 days (eight hours per day) until examination of the extract showed only minute amounts of theobromine being removed. Results by this method are also given in Table I.

Conclusions

It will be seen from Table I that in the case of tea 60 to 75 mg. (1¼ grains) of caffeine will be found in the average cup. The brewing time was five minutes. This is the time suggested by the tea industry and by tea lovers. Many may not use as long a brewing time as this, but other research has shown that 50 percent of the caffeine is extracted in the first minute of brewing, and practically all by the end of four minutes.

In the case of coffee, the amount of caffeine in the cup varied from 68 to 101 mg. (1 to 1½ grains), depending probably largely on the grind and the method used. Caffeine is extracted somewhat more slowly from coffee than from tea, and the time during which the coffee is in contact with the water will determine the amount in the cup. Unless excessive amounts of coffee are used, a cup of the brew probably will never contain much more than 100

★

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mg. (this amounts to 1½ grains).

The two "cola" beverages contained different percentages of caffeine. Brand *A* contained 6¼ mg. per fluid ounce, and *B* about 9 mg. As a rule one consumes a bottle at a time and in one case would get about 5.8 grains and in the other 1⅔ grains of caffeine.

In the case of the cacao products, amounts of caffeine and theobromine vary widely. Apparently the removal of the fat from chocolate in the manufacture of cocoa results also in the removal of some of the caffeine and theobromine. At any rate in the cups of cocoa and chocolate the caffeine content is small. The theobromine content is over ¾ grain in the former and about 2 grains in the latter and its physiological action must be appreciable. In the case of bar milk chocolate, however, the caffeine consumed is about as much as in a cup of tea or coffee while the theobromine is 5 to 7 grains. These figures may seem high compared to some in the literature. This may be due to the fact that older methods did not really get out all of these substances, as well as to variations in the cacao used in the bar.

The list of products analyzed includes only a few of such beverages and foods which are commonly consumed very day both by adults and by children. There are many other "cola" type beverages on the market, some nationally distributed, some sectionally. There are many varieties and brands of chocolate and cocoa sold, and cacao products find their way into a variety of foods, such as ice creams, candies, chocolate-milk drinks, cakes, icings and desserts. When the list of such foods is considered, it is evident that practically every person consumes caffeine and theobromine containing foods and beverages very frequently and consumes appreciable quantities of caffeine and theobromine *with no noticeable bad effects*. It would seem time that the true facts are appreciated and efforts made to present them to the public in an unbiased form.

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1. "Methods of Analysis of the A.O.A.C.", 5th Edition, p. 195, McGraw-Hill Book Co., New York, N. Y.
2. Leach and Winton, "Food Inspection and Analysis," 4th Edition, p. 413, John Wiley & Sons, New York, N. Y.
3. Parkes and Parkes, *Analyst*, vol. 62, 791, 1937.
4. Wadsworth, *Analyst*, vol. 46, 32, 1921.
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6. McDonald, Annual Report on Cacao Research, Imperial College of Tropical Agriculture, Trinidad, 1936.
7. Humphries, Annual Report on Cacao Research, Imperial College of Tropical Agriculture, Trinidad, 1938-39.
8. Palkin, Murray and Watkins, *Industrial and Engineering Chemistry*, vol. 17, 612, 1925.

Dehydrating Vegetables

(*Continued from page 49*)

The tray load may be as much as 1.75 lb. per square foot; although overloading of the trays should be avoided in order that drying will be uniform and rapid.

Corn is quite resistant to high temperatures and the finishing temperature can be 160 to 165 deg. F.

It should be dried to less than 5 percent moisture.

Egg-Plant—This vegetable is prepared and dried as described for summer squash and zucchini squash.

Garlic—Garlic is dehydrated in considerable quantities for preparing garlic powder. The "buttons" or "cloves" are separated and much of the outer paper-like skins can be removed by abrasion-type, rotary vegetable peeler of the type used for potatoes, or by tumbling in a rotating screen cylinder in a blast of air that winnows out the dry skins. If to be used for making powder the skins need not be removed.

The buttons may then be sliced and spread on trays at the rate of about 1.0 to 1.25 lb. per square foot. Usually the vegetable is not blanched, or at most is given only a very short blanch in live steam. Prolonged blanching results in excessive loss of flavor.

The finishing temperature should not exceed 145 deg. F. The product is dried bone dry, so that on cooling it can be powdered in a hammer mill and the resulting powder sifted to give a smooth flour. This is sealed in tight tin containers to prevent moisture absorption and consequent darkening and deterioration in flavor. Or the dried slices may be added to soup mixtures or packed for use in cooking.

Horse Beans (Fava Beans)—These beans are grown in California rather extensively during early Spring for the Italian trade, often as an inter-crop in orchards. The beans are used in the green condition after shelling. They may be shelled from the pods by machine in the same manner as peas and lima beans. Shelling by hand is very laborious and would be too costly for commercial dehydration.

As the beans bruise easily it is advisable to blanch them very soon after shelling. They may be spread on trays, steamed 5 to 10 minutes and dehydrated at not above 145 deg. F. to less than 5 percent moisture.

Kohlrabi—This vegetable is prepared and dried as described for summer squash.

Directions for preparing other vegetables for dehydration will be published in April.—The Editors.

References

22. P. F. Nichols, R. Powers, C. R. Gross and W. A. Noel, Commercial Dehydration of Fruits and Vegetables, U. S. Department of Agriculture *Bulletin* 1335, 1-40, 1925.

Bottom Vents For Vertical Retorts

(*Continued from page 42*)

contents of the retort had been heated about 170 deg. F. before the start of the test. This heating was done by blowing steam through the retort. When the cans were sufficiently hot, the steam was shut off and air was blown through the retort for several minutes. It is realized that it was impossible to duplicate conditions between different runs by this method and consequently the steam consumption results may be in considerable error in either direction. In making these tests only the most successful methods of operation as shown by the previous tests were tried.

Test 5—Conventional Method—High Initial Temperature. This test was conducted in the conventional manner similar to test 1A. The ¾-in. vent was closed at 230 deg., when temperature and pressure agreement was reached.

At steam-up time the thermocouple in the center of the middle crate indicated 8 deg. F. below retort temperature and five minutes later still showed 2 deg. F. below (see Table I). Although this is not as undesirable as the 30-deg. F. difference at steam-up indicated in Test 1A, it does indicate that an air pocket existed in the center crate.

Test 6—Bottom Venting by Hand-operated Valve—High Initial Temperature. This test was conducted in a manner similar to Test 2A. The ¾-in. bottom vent was closed at 230 deg. F., when temperature and pressure agreement was reached.

Results shown in Table I show that, as in the similar low-initial-temperature tests, this method of operation was superior to the conventional method. Superior heat distribution plus savings in steam and come-up time are apparent.

Test 7—Automatic Bottom Venting by Thermostatic Steam Trap. This test was conducted in a manner similar to Test 3B in which a 1¼-in. thermostatic steam trap set to close on a differential of 2 deg. F. was used.

Again, as shown in Table I, the results were satisfactory. The thermostatic trap remained open until the air was eliminated from the retort, providing very satisfactory automatic venting.

[1] Robert Dillman, "How the Canning Industry Uses Heat," *Food Industries*, July, 1932.

FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

ENGINEERING

Freezing Retards Staling of Bread

SHARP-FREEZING methods have been used in an attempt to increase the length of time that bread can be kept fresh and salable by freezing at —22 deg. C. or —35 deg. C. Three methods have been used during these experiments. These methods are: Quicker freezing by employing a freezing tunnel; variations in formula and use of oat flour as an antioxidant; and hermetically sealing in the normal atmosphere and in vacuum, employing modern canning technique, before freezing.

The quickest method of freezing employed to reduce the bread to the solid state (internal temperature —10 deg. C.) in 60 minutes. The quicker freezing method did not show a significantly longer keeping time for the bread than sharp freezing at the same temperature.

Variations in the formula or the use of oat flour as an antioxidant (directly in the product or on the wrapping paper) did not lengthen the keeping time significantly, according to organoleptic tests, although oat flour showed a slight lengthening of the keeping time according to peroxide values.

The baking and subsequent canning (hermetically sealed at normal atmosphere and in vacuum) gave the bread a greatly increased keeping time. The bread sealed in the normal atmosphere remains salable in a period of approximately one year, while that in the vacuum not only remains salable, but remains quite similar to fresh bread for this same period.

Digest from "Further Studies on the Retardation of the Staling of Bread by Freezing," by William H. Cathcart, *Cereal Chemistry*, Vol. 18, 771-777, November, 1941.

DAIRY PRODUCTS

Ultraviolet Rays Applied to Milk

THE LETHAL EFFECTIVENESS of ultraviolet energy applied to smooth-flowing milk films is dependent upon the intensity and spectral characteristics of the radiation employed. According to tests, a greater bactericidal effect was employed by ultraviolet radiation applied to smooth-flowing milk films than was obtained from films flowing over a corrugated cooler surface. The effectiveness of the lethal radiation was relatively greater per unit volume of milk when applied to flowing films than when applied to stationary films having the thickness of an adhesion layer only.

Short ultraviolet radiation predominantly in the 2200-2300 Angstrom region gave erratic bactericidal results, with evidence that sublethal doses may cause stimulation. The total lethal effect of ultraviolet energy and elevated temperatures simultaneously applied for less than one second appears to be an additive process.

Percentage reduction in bacteria counts of raw mixed milk in excess of 90 percent and frequently up to 95 to 98 percent may be obtained with a high degree of regularity by preferred methods of applying ultraviolet radiation of approximate intensity and spectro characteristics.

Digest from "The Lethal Effectiveness of Ultra Violet Rays Applied to Milk," by G. C. Supplee, G. E. Flanigan and O. G. Jensen, *Journal of Dairy Science*, Vol. 24, 1055-1069, 1941.

Organism Found in Dairy Plant Equipment

THE ISOLATION of *Ps. putrefaciens* from various points in churns and from the insulation of a leaky vat indicates that equipment may be a source of the organism in dairy products. Evidently, *Ps. putrefaciens* survives the cleaning and heating of equipment due to protection afforded in crevices, cracks and joints. The churns from which *Ps. putrefaciens* were isolated were reported to have received thorough and regular cleaning.

The fact that plates smeared with material from churns not yielding *Ps. putrefaciens* often were heavily seeded with other species, many of which were not heat resistant, is additional evidence that conditions in certain churns may be favorable for *Ps. putrefaciens*. It also suggests that equipment may yield other organisms capable of causing defects in dairy products.

The flora of certain plates smeared with material from churns definitely resemble the flora of plates prepared from putrid butter. Such plates, regardless of whether or not *Ps. putrefaciens* is present, usually contain micro-cocci, spore-forming bacteria, gram-negative rods and other yeasts and molds. This suggests that with defective and highly contaminated butter much of the contamination may originate in the churn.

Digest from "Pseudomonas Putrefaciens in Dairy Plant Equipment," by H. F. Long and B. W. Hammer, *Journal of Dairy Science*, 921-924, November, 1941.

VITAMINS

Vitamins From Alfalfa Meal

THE UNSAPONIFIABLE CONSTITUENTS of alfalfa leaves include beta-carotene, which is completely utilized as a source of vitamin A in the animal body. A concentrate of unsaponifiable matter from alfalfa leaves also contains sterols which yield vitamin D when irradiated with ultraviolet light. The concentrate from a ton of alfalfa leaf meal is approximately equivalent to 34 kg. of fish liver oil containing 10,000 international units of vitamin A and 500 units of vitamin D per gram. Irradiation of the concentrate to convert sterols to vitamin D does not destroy carotene. Consequently, the irradiated alfalfa leaf concentrate retains its vitamin A potency.

Digest from "Lipides Isolated form Alfalfa Leaf Meal," by H. G. Petering, P. W. Morgal and E. J. Miller, *Industrial and Engineering Chemistry*, Vol. 33, 1428, 1941.

Tocopherols (Vitamin E) From Soybean Oil

DISTILLATES containing 14 to 18 percent of tocopherols are readily obtainable from soybean oil by distillation in a cyclic molecular still. As with other natural oils, 10 to 50 percent of the total tocopherol content remains in the undistilled residue. Crude soybean oil from two sources contained, respectively, 0.212 and 0.152 percent tocopherols. Refining losses lowered the final content to 0.175 and 0.125 percent respectively. Insofar as tocopherol content is a measure of vitamin E potency, soybean oil is a good source

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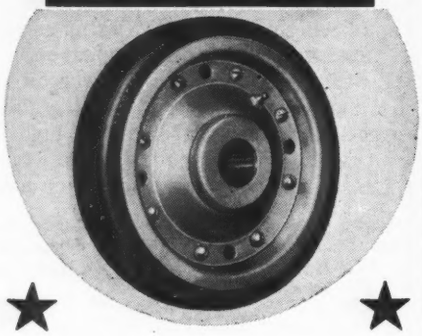

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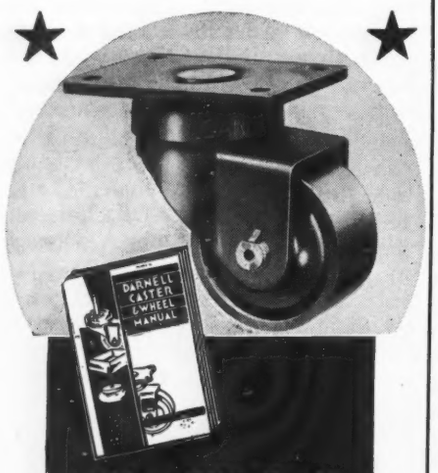

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of the vitamin, as indicated in the table below. Only wheat germ oil, one of the richest of all oils in vitamin E, ranks higher among the oils included in this test.

Oil	Tocopherol (percent)
Soybean I (crude)	0.212
I (refined)	0.175
II (crude)	0.152
II (refined)	0.125
Wheat germ I	0.310
II	0.380
Cottonseed (Wesson)	0.110
Corn (Mazola)	0.119
Olive	0.025
Coconut (hydrogenated)	0.003
Cod liver	0.026

Tocopherols in the soybean oil distillate behaved much like synthetic tocopherol, but a considerable proportion of the total tocopherol content (as indicated by colorimetric analysis) resisted distillation. Possibly part of the tocopherol is present as nonvolatile esters.

Digest from "Distillation of Tocopherols from Soybean Oil," by F. W. Quackenbush, H. L. Gottlieb and H. Steenbock, *Industrial and Engineering Chemistry*, Vol. 33, 1276, 1941.

MEATS

Anaerobic Organisms In Meat

GREEN TAINT in meat is due to anaerobes such as *Clostridium aporogenes*, although spoilage is sometimes almost at the surface. Infection may be introduced by use of contaminated pickle, or by injecting the pickle with a dirty needle. Bone taint is commoner in beef than in pork, but some cases of ham souring are caused by the same anaerobes which cause bone taint in beef. This infection is not outwardly apparent, but when an infected hindquarter is cut open or pierced down to the aitch-bone, it is offensively malodorous and tissue next to the bone may be green. Infections still occur, though modern meat handling practice makes them much rarer than formerly. To detect infection of meat anaerobes, the surface organisms (aerobes) must be removed, after which the sample is trimmed with sterile instruments and seared. Fragments of interior tissues are then sown in a suitable medium, e.g., Robertson's meat medium (a tube of nutrient broth with a layer of lightly cooked minced meat at the bottom). This preliminary culture is seldom pure. A spore suspension is next prepared, eliminating aerobes and non-spore formers. The next culture may be started from a single isolated cell (Chambers micromanipulater method) or by surface colonies or by deep colonies in Veillon agar tubes. The deep colonies quickly reveal aerobic contamination if any has occurred. Most of the infecting anaerobes belong in the genus *Clostridium* and can be identified.

Digest from "Isolation of Anaerobes From Tainted Meat," by R. B. Haines. *Chemistry and Industry*, Vol. 60, 413, 1941 (Published in England).

SUGAR

Crystallizing Sugar

A SIMPLE METHOD for controlling crystallization in producing a second crop from molasses requires only the analysis of a filtered sample from the sirup. Knowing the apparent water content and apparent purity, and the composition of the original sirup, the optimum water content is readily calculated and water is added accordingly. A major advantage is that this method of controlling the subsequent crystallization also reveals whether or not the previous crystallization was correctly conducted, especially with respect to cooling and dilution.

Digest from "Crystallization Control in After-crystallization and a Simple Method for Controlling Dilution," by H. Claasen. *Centralblatt fur die Zuckerindustrie*, Vol. 49, 206, 1941 (Published in Czechoslovakia).

Caramel in Roasted Coffee

WHEN COFFEE is roasted in the presence of cane, beet or corn sugar or molasses, the amount of aqueous extract decreases with increasing caramelization if raw sugar or molasses was used, but not with pure cane sugar. The difference is presumably due to inorganic impurities contained in molasses and in raw sugars. The caramel from pure cane or beet sugar can all be extracted from coffee, as is indicated by tests with known mixtures of ground coffee and separately prepared caramel. When the caramel is derived from raw sugar or molasses it is not quite all extractable. Examination of the caramel recovered from coffee shows a water-soluble fraction and a water-insoluble residue. The soluble fraction includes a smaller fraction which is also soluble in methanol. Not all the caramel is derived from added sugar. Coffee itself contains substances which are easily converted to sugar and so yield caramel-like products when roasted. The amount of aqueous extract yielded by different coffees varies a great deal, for example from 21.8 percent in Lavado Brazil and Mocha (Arabia) to 33.1 percent in Rio coffee. The methanol extract varies from 8.4 percent in Yungas Bolivia to 12.6 percent in Chato Santos. The Java coffee which was studied in comparison

with other varieties was high in methanol extract (12.36 percent) and medium in aqueous extract (26.74 percent).

Digest from "Caramel in Roasted Coffee," by Pedro Cattaneo and Jose Viggiano, *Anales de la asociacion quimica argentina*, Vol. 29, 149, 1941 (Published in Argentina).

GRAINS

Protein Surveys of Wheat

STUDIES have been completed of protein content of 14 crops of hard spring wheat marketed through Minneapolis, Minn., from 1925-26 to 1938-39. In general it appears that the protein content tends to increase in progressing from the Eastern to the Western reaches of the spring wheat area, although this is not true in all seasons.

Dark northern spring wheat had a higher average protein content than northern spring in the four seasons when subclass comparisons were made. Soft red winter and white wheats grown chiefly in Illinois, Indiana, Ohio, and Michigan, during the crop seasons of 1931–32 to 1937–38, contain a lower average percentage of protein than the hard spring wheats harvested during the same season. Variability in the protein content of the samples of soft red winter wheat was only about half as great as the variability among the hard spring wheats.

Rainfall appeared to be prominent among the climatic factors influencing the protein content of the crop. Correlation between rainfall and average protein content was not perfect, however, since there was a carryover of the effect of previous seasons.

Digest from "Protein Surveys of American Hard Spring and Soft Winter Wheats," by C. H. Bailey, *Technical Bulletin No. 147*, University of Minnesota, Agricultural Experiment Station, June, 1941.

MISCELLANEOUS

Chlorine Dioxide Used As Flour Bleaching Agent

CHLORINE DIOXIDE is an effective bleaching and maturing agent. Compared with other commercial bleaching agents, smaller dosages in terms of grams per barrel are required; hence its application requires accurate control. Clear flours require heavier dosages than patent flours.

When chlorine dioxide is used in the amount needed to give optimum baking characteristics, it usually removes more color than the optimum quantity of nitrogen trichloride on the same flour. Grain and loaf volume usually reflect the maturing action of chlorine dioxide. Dough handling properties are affected sometimes, a dryer feeling dough being obtained. The pH of flour is not affected by the quantity of chlorine dioxide used in flour bleaching. For optimum keeping quality, the dosage should be kept preferably below 2 grams per barrel of flour.

Digest from "Flour Bleaching with Chlorine Dioxide," by Charles G. Ferrari, W. F. Hutchinson, Alice B. Croze and E. K. Mecham, *Cereal Chemistry*, Vol. 18, 699-705, November, 1941.

Nutritive Value of Agar And Irish Moss

THE NUTRITIVE VALUE of agar and Irish moss has been studied by feeding rats for a ten-week period on a controlled diet supplemented with 5, 10, 20 and 30 percent of prepared agar and 5, 10 and 20 percent of Irish moss refined for food purposes.

The apparent digestibility coefficient of the nitrogen-free extract of agar is about 28 percent and that of Irish moss is about 50 percent, irrespective of the level included in the diet. There is a significant progressive depression in the apparent digestibility of dry matter of the remainder of the diet as the level of agar or Irish moss is increased. This depression amounted to almost 10 percent when high levels of agar and Irish moss were fed. Only the nutritive value of these were studied.

Digest from "Nutritive Value of Agar and Irish Moss," by Hugo W. Nilson and Joseph W. Schaller, *Food Research*, Vol. 6, 461-469, Sept.-Oct., 1941.

Utilizing Citrus Wastes

A CATTLE FEED which is cheaper than beet pulp is obtained from wastes (peel, seed and rag) produced by citrus fruit canneries. The raw pulp is comminuted by a high speed hammer mill while adding dilute (2 percent) calcium hydroxide solution. This alkalizing step is responsible for the success of the process. The limed pulp is further shredded in a pug mill, pressed and dried. The final product weighs about 18 lb. per cubic foot and will absorb about five to eight times its weight of water. For this reason it is particularly valuable for maintaining sufficient water in the diet of cattle.

The dry feed contains at least 6 percent crude protein, at least 2.5 percent crude fat and not over 20 percent crude fiber.

Digest from "Utilization of Citrus Wastes," by F. J. Van Antwerpen, *Industrial and Engineering Chemistry*, Vol. 33, 1422, 1941.

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FORMULAS FOR FOODS

FORMULA NO. 282

Cartago Fruit Jelly

Granulated sugar	50 lb.
Standardized invert sugar	25 lb.
Corn sirup	25 lb.
Agar agar No. 1	1¾ lb.
Water	75 lb.
Ripe banana powder containing milk solids	3½ lb.
Shredded preserved citron	8 lb.
Papaya No. 1 (See Formula No. 47)	5 lb.
Color as desired	

Mixing Directions

Soak the agar-agar in the water for at least 2 hours, preferably overnight. Place the soaked agar-agar into a kettle, heat and stir occasionally until it boils for several minutes. Add the granulated sugar and the standardized invert sugar and boil the batch to 222 to 224 deg. F. Now add the corn sirup, mixing well. Sift the banana powder into the batch, stirring constantly. Then add the preserved fruit, papaya and color, and mix well. Spread the batch out on heavy waxed paper and when cold, cut into pieces. Then roll in XXX or granulated sugar.

For cast jellies, eliminate the shredded citron and deposit the jelly into starch which has been tempered to 125 deg. F. When the candies are cold, they may be steamed and rolled in sugar or coated with icing or chocolate.

Formula from Nulomoline Co.

FORMULA NO. 283

Banana Tea Bread

Sugar	14 lb.
Shortening	8 lb.
Salt	4 oz.
Ripe bananas (peeled)	24 lb.
Whole eggs	10 lb.
Bread flour	21 lb.
Baking cream	8 oz.
Soda (sifted)	6 oz.

Mixing Directions

Place the sugar, shortening and salt in cake machine using paddle beater and cream until light and fluffy. Add the ripe bananas and beat to break up thoroughly. Use only full-ripe bananas—yellow peel well flecked with brown. Add the whole eggs and cream thoroughly. Add the bread flour, baking cream and soda and mix only enough to incorporate and smooth out the dough. If baking powder is to be used in place of baking cream, use 12 oz. of baking powder and 2 oz. of soda in place of the baking cream and soda called for in the above formula.

Scale 1 lb. 9 oz. mixture in a 9 x 5 x 2-in. loaf pan. Bake at 335 to 340 deg. F. for 60 to 65 minutes. Do not bake at a too high temperature.

Formula from Fruit Dispatch Co.

FORMULA NO. 284

Boston Brown Bread

Whole-wheat flour	2 lb.
Rye flour	2 lb.
Yellow cornmeal	2 lb.
Baking powder (variable)	1 oz.
Molasses	1 qt.
Soda	1 oz.
Milk (variable)	2 qt.
Salt	1 oz.
Yeast	¼ oz.
Butter	8 oz.

Mixing Directions

Place molasses in bowl, add the soda, milk and salt. Add the yeast, dissolved in a little water, and then the butter. Add the blended flour, cornmeal and baking powder last. Mix to a smooth dough. This formula will make approximaetely ten loaves of bread of the usual size.

Formula from General Mills, Inc.

FORMULA NO. 285

Pie Wash

Melted butter makes an excellent wash for pies. If a less expensive wash is desired, dilute with warm milk. After the pies are washed, allow them to stand until the wash has set. A more uniform color is obtained by using this procedure than if not used.

Thick egg wash should never be used. Mixtures of one part egg to three parts of milk are sufficiently concentrated to produce a nice, golden color, while thicker solutions produce an objectionable condition such as an "artificial glaze" appearance.

Formula from Swift & Co.

FORMULA NO. 286

Pan Grease

Pan grease may be classified as follows: (1) 100 percent shortening or oil; (2) shortening and oil mixture; (3) shortening and flour mixture; (4) shortening, flour and oil mixture.

Types 3 and 4 are required when richer cakes are in use. Types 1 and 2 can be used with cakes low in liquid and sugars.

Cocoa, soybean flour, starch and cottonseed flour are added at times to types 3 and 4, either for economy or to serve a particular purpose.

Typical Formulas

(1)

Shortening	2 parts
Bread flour	1 part

(2)

Shortening	1 part
Oil	1 part
Bread flour	1 part

(3)

Shortening	4 parts
Bread flour	1 part
Soybean flour	1 part

(4)

Shortening	8 parts
Bread flour	3 parts
Cocoa	1 part

For Spray Gun

(1)

Shortening	6 parts
Oil	3 parts
Bread flour	2 parts

For Machine Spray Gun

(1)

Shortening, high ratio	2 parts
Flour	1 part

Mix 30 to 35 minutes in high speed to obtain a temperature between 80 and 82 deg. F.

(2)

Compound	2 parts
Cake flour (mix as above)	1 part

(3)

Shortening, hydrogenated	7 parts
Bread flour	3 parts
Oil (salad or vegetable)	½ part

(4)

Shortening, hydrogenated	5 parts
Soybean flour	1 part

Formula presented by Arthur Hackett at [annual meeting of American Society of Bakery Engineers,] Chicago, March 14, 1940.

FORMULA NO. 287

Pâté de Foie Gras

Cut the fat from the livers and render. Steam the livers until cooked; then allow to become cold. Pass the livers through the fine plate of a mincing machine. Add hot fat through a fine sieve to livers and mix well. To 1 lb. of the mixture add 4 oz. of black

(Turn to page 107)

Lots of people sat here . . .

THERE are three kinds of prospects every salesman meets: The first kind say "Yes, I'll buy." The second kind say "No—get out!" The third kind say neither "Yes" nor "No".

When we introduced CERELOSE (pure Dextrose) to food industries, we met a number of smart "Yes" men—but a lot more "No" men and most men "On the fence".

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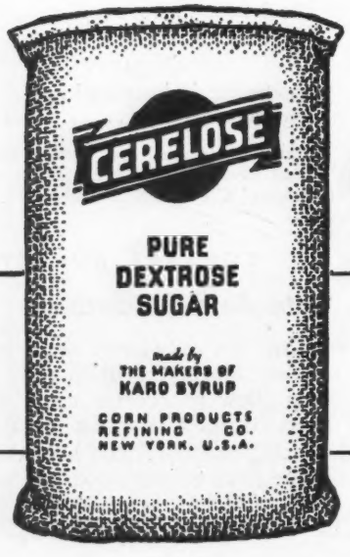

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truffles (chopped fine), together with a little salt, cayenne and mace. Mix well and reduce to a paste using mincing machine, edge-runner or colloid mill. Fill into containers and sterilize. Pork and lard are sometimes mixed with goose liver. Another method of treatment is to pack the goose livers, after cleaning, with truffles between them (2 lb. of liver and 1 lb. of truffles) and leave in refrigerator for about a week; after which the livers are cooked, seasoned and reduced to paste.

Formula from H. B. Cronshaw, London, England. Republication rights reserved.

FORMULA NO. 288

Fruits, Spice Preparation

Water	20 gal.
Dry ginger root	12 oz.
Whole cloves	14 oz.
Stick cinnamon	18 oz.
Cider vinegar (40 grain)	3 gal.
Sugar	125–130 lb.

Mixing Directions

Place the spices in a cheesecloth bag. Place it in a container in which water, vinegar and sugar have been added to form a sirup. The fruit that is to be "spiced" is placed in the container and cooked in the sirup in the regular manner or to a preserve consistency. It is allowed to stand overnight to absorb sirup, and then the spices are removed and the fruit is packed in vacuum-sealed preserve jars and pasteurized at 175 to 180 deg. F. for 30 minutes. If the fruit tends to shrivel during cooking, it is blanched until tender in boiling water before cooking in the sirup.

Formula from "Utilization of California Fruits," by W. V. Cruess and G. L. Marsh, Circular 349, University of California College of Agriculture, October, 1941, p. 40.

FORMULA NO. 289

Milk Chocolate Icing

Fondant icing (238 to 240 deg. F.)	68 lb.
Emulsifying shortening	16 lb. 8 oz.
Salt	4 oz.
Evaporated milk	8 lb. 8 oz.
Pure vanilla	12 oz.
Dark chocolate (melted)	6 lb.

Mixing Directions

Blend the fondant icing, emulsifying shortening and salt on low speed. Cream 2 minutes on second speed. Incorporate 4 lb. of evaporated milk and vanilla on low speed. Cream 2 minutes on second speed. Incorporate the melted chocolate. Mix in the remaining 4 lb. 8 oz. of evaporated milk and cream for 2 to 3 minutes on second speed.

Formula from Brown's Hungarian Corp.

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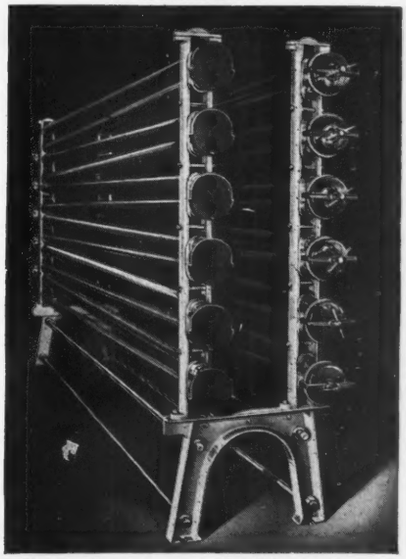

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FORMULA NO. 290

Stages of Beaten Egg Whites

Stage	Description	Uses
1. Slightly beaten (foamy)	Frothy or slightly foamy; large air bubbles; transparent; flows easily	Clarifying "coating" emulsifying and thickening
2. Stiff foam (wet peak)	Frothy quality decreases; air bubbles are small; has white color; flows if bowl is tipped; appearance is shiny, glossy and moist; liquid separates readily upon standing; whites follow beater when withdrawn and form rounded peaks	Soft meringues; angel food cake, is made by the meringue method
3. Stiff	Is no longer foamy; air bubbles are very small; color is very white; whites may slip very slightly if bowl is tipped; appearance is still glossy, smooth and moist	Cakes, tortes, omelets, souffles, marshmallows, hard meringues, ice creams, and sherbets
4. Dry	Color very white but dull; small flakes or curds begin to show; consistency is rigid and almost brittle; particles will be thrown out of bowl, especially by a whisk beater; liquid separates very slowly at bottom upon standing	Shirred eggs

Formula from Institute of American Poultry Industries.

FORMULA NO. 291

Banana Spice Cake

Sugar	10 lb.
Shortening	5 lb.
Soda	1¼ oz.
Salt	2½ oz.
Cinnamon	1¼ oz.
Nutmeg	⅝ oz.
Vanilla	1¼ oz.
Ripe bananas	12 lb. 8 oz.
Whole eggs	3 lb. 12 oz.
Cake flour	11 lb. 4 oz.
Baking powder	3¾ oz.
Milk (variable)	2 lb. 8 oz.

Mixing Directions

Place sugar, shortening, soda, salt, cinnamon, nutmeg and vanilla in cake machine using paddle beater and cream until light and fluffy. Add ripe bananas and beat to break up thoroughly. Add the whole eggs slowly while creaming. Add the cake flour and baking powder and mix smooth and then add only enough milk to incorporate.

Use a 13-oz. mixture for 9-in. round layer pan. Bake at 360 to 375 deg. F. Well-greased pans should be used and care should be taken not to overbake.

Formula from Fruit Dispatch Co.

FORMULA NO. 292

Butterscotch Sauce No. 1

Light brown sugar	13 lb.
Corn sirup	11 lb.
Butter	3.5 lb.
Cream	12 lb.

Mixing Directions

Cook the sugar, corn sirup and butter to 236 deg. F. Then add the cream gradually, stirring constantly.